



**PROGRAM SPECIFICATION - SPECIMEN SESSION-2026-27**

<b>Introduction of Institute and Programs</b>	Given Below (Program Only)
<b>Course Title</b>	Master of Science in Biostatistics and Epidemiology (MSBE)
<b>Course Duration</b>	2 years
<b>Type of Study</b>	Non-Clinical
<b>Study System</b>	Semester System
<b>Total Credit Hours</b>	43/46
<b>Credit Hours Distribution - Semester Wise</b>	Appendix 1
<b>Study Hours Distribution</b>	Appendix 1 Working Days = Saturday and Sunday Timings = Saturday: 3:00 PM to 09:00 PM Sunday: 9:00 AM to 6:00PM
<b>Teaching Hours Distribution</b>	Appendix 1
<b>Modules Detail with Credit Hours</b>	Appendix 2
<b>Assessment of Student</b>	30% Internal Assessment via Quizzes, Assignment etc. and 70% Final Exam
<b>Degree Awarding Institution</b>	School of Public Health, DUHS



## **Master of Science in Biostatistics and Epidemiology (MSBE)**

### **About the program:**

This program will prepare students to apply epidemiological and statistical principles to quantitative analysis of health care issues. It would be aimed to train the health scientist and health professionals in different organizations such as research hospitals, public health organizations, pharmaceutical companies and other medical and health services research agencies where increasingly complex health-care data are expected to be analyzed and interpreted.

Combining these two disciplines (Biostatistics and Epidemiology) into one degree program will offer the students the benefits of understanding the basis theoretical principles behind epidemiology, so that they can better understand and apply these statistical principles to new and emerging biological and health related fields, challenges and threads.

The applications of this field of knowledge are enormous. Biostatistics and Epidemiologists are helping health scientists better understand the impact of chronic illnesses such as artery diseases, cancers, hepatitis and diabetes on our population and help detect new and emerging health threads. The program is tailored to understand in-depth knowledge of epidemiology, biostatistics and its application in analyzing the major public health issues in Pakistan and developing countries.

### **Program Structure:**

It would be a two-year weekend program, comprising of 4-semester. All the course work will be scheduled during the four semesters, and the last semester will be assigned for thesis writing with the least load of coursework.

### **Eligibility Requirement:**

Application for admission in this program must have a 4-year bachelor's degree in a discipline related to health sciences or statistics from an accredited institution, approved by Higher Education Commission of Pakistan. Such fields include, but not limited to, medicine, biology, dentistry, nursing, health science, veterinary sciences, psychology, biostatistics, statistics and mathematics. Applicants will require sending the application form along with academic records, two letters of reference and a brief outline of his/her career goals.



### **Evaluation of Application:**

- Application will be reviewed by the admission committee and eligible candidates will be called for admission test.
- Candidates will be shortlisted on the basis of academic record and admission test results. The shortlisted candidates will be invited for the interviews with the selection committee.
- Final selection will be made by the admission committee of DUHS on the basis of admission test and interviews.

### **Program Requirements:**

Students of this program must:

- i) complete 14 required credit courses
- ii) complete and successfully defend the thesis program

### **Thesis Requirements:**

An MS thesis is usually a project which addresses well-defined objectives and/or hypothesis. This may be either:

- A) a small stand-alone project involving study design, data collection, analysis and interpretation, or
- B) the analysis and interpretation (relevant to objectives) of either previously collected data, or data from a discrete subsection of an ongoing project.

### **Timeline for Students:**

A student must complete their required 14 credit courses in two years. Ideally, the thesis will be completed by the end of the second year of registration. However, the thesis must be completed by the end of the third year; else the case will be decided by the Board of Advanced Studies and Research (BASR) of the university.

### **Progress Requirement:**

The university review committee will require a student to withdraw from the program if he/she is not making adequate progress. This progress include following the time line recommended above, regularly meeting with the thesis supervisor and maintaining a continued effort on the thesis research as well as maintaining at least a C+ average in course work.



### Appendix 1

<b>Semester 1</b>		
<b>(14 credits hours, 3 credit hours for first 4 courses &amp; 2 for MSBE705)</b>		
1)	MSBE 701	Fundamentals of Epidemiology
2)	MSBE 702	Introduction to Biostatistics
3)	MSBE 703	Fundamentals of Public Health
4)	MSBE 704	Research Methodology
5)	MSBE 705	Fundamentals of Mathematics
<b>Semester 2</b>		
<b>(15 credits hours, 3 credit hours for each course)</b>		
1)	MSBE 706	Communicable Diseases
2)	MSBE 707	Biostatistics II
3)	MSBE 708	Advanced Epidemiology
4)	MSBE 709	Non-communicable and newly emerging diseases
5)	MSBE 710	Demography
<b>Semester 3</b>		
<b>(8 credits hours, 3 credit hours for MSBE 711 and 712 &amp; 2 credit hours for MSBE 713)</b>		
1)	MSBE 711	Statistical Methods in Epidemiology
2)	MSBE 712	Biostatistics III
3)	MSBE 713	Survey Sampling
<b>Semester 4</b>		
<b>(3 credit hours for MSBE 714 &amp; for MSBE 715, 6 credit hours for thesis or 3 for project)</b>		
1)	MSBE714	Multivariate Modeling and Advanced Biostatistics
2)	MSBE 715	Thesis/Research Project

Thesis Defense

**Total 46 credit hours (43 in case of project)**



## **Appendix 2**

### **MSBE701: Fundamental of Epidemiology**

Principles and methods used to investigate the distribution, determination, and prevention strategies for disease in human populations. Major topics include: disease classification, measures of disease frequency and relative effect, comparisons, and contrast of analytic study design, methods used to isolate effects, and screening for latent disease.

Definition and contrasts of cumulative incidence, incidence rates (density), and hazard rates. Contrast of confounding versus effect modification. Mantel-Haenszel relative effect, measures and significance-test results for relative effect. Risk deference measures frequently used in case-control and cohort investigations. Relative-effect measures for observational case control. Cohort investigation using dichotomous exposures, estimation of effect of bias and misclassification, and correction for bias and random error.

### **MSBE702: Introduction to Biostatistics**

Fundamental procedures of collecting, tabulating, and presenting data. Measures of central tendency and dispersion, discrete and continuous distributions, sampling distribution t-test, confidence intervals, chi-square. Emphasis on statistical inference. SPSS/Minitab statistical program.

### **MSBE703: Fundamentals of Public Health**

Explanation of terminology, Models for understanding public health, various actors and disciplines involved, and the range of measures available. Preventive strategies, public health impact, and screening. Diseases control from multidisciplinary perspective, Infectious diseases control economics, social sciences, and policy aspects of diseases control success and failures.

Examination the four elements of the management process: planning, organizing, leading, and controlling. Identifies principles to assist managers in adapting these elements to fit a variety of situations and public health organization. Reviews methods to improve the quality of managerial decisions in small and large, for profit and non-profit organizations.

### **MSBE704: Research Methodology**

Introduction of research, a review of relevant literature and other sources of information, Knowledge of the required structure and approach, study designs, development of questionnaire, Protocol writing, writing a scientific paper or report. Describe the submission and assessment process for a peer reviewing article, write a scientific paper with appropriate contents and format.

### **MSBE705: Fundamentals of Mathematics**

Types of Numbers and Notations, Exponential and Logarithmic Functions, Types of Equations, Matrix and Determinants, Differentiation and Integration



### **MSBE706: Communicable Diseases**

Factors that suggest a disease has an infectious cause, factors determining the spatial, temporal and social distributions of communicable diseases. Measures transmissibility of infections design, carry out, analyze, interpret and report and outbreak investigation, principles underlying mathematical models of communicable diseases, evaluation of vaccine efficacy, epidemiological methods through the study of specific diseases.

### **MSBE707: Biostatistics II**

Analysis of variance (fixed-effects model) with multiple comparisons, Correlation and simple linear regression, Multiple Linear Regression, Power analysis and sample-size determination for these models. Factorial designs, including repeated measures and mixed models. Non-parametric inferential methods Inter and Intra Examination Reliability.

### **MSBE708: Advanced Epidemiology**

Study of complex epidemiologic models found in the current epidemiology literature. Course topics include analysis of study design, bias and misclassification, building a linear model for epidemiologic inference, analytic strategies used in epidemiologic analysis of complex data sets. Critical review of the epidemiology of the major causes of cancer death in developing anatomy and morphologic / pathogenic classifications. Descriptive epidemiology of the major cardiovascular disease, including myocardial infarction, sudden death, angina pectoris, hypertension, and stroke. Epidemiology evidence relating risk factors such as diet, smoking, and physical activity to aging and age-related chronic degenerative diseases (i-e., osteoporosis, and dementia).

### **MSBE709: Non-Communicable and Newly Emerging Diseases**

Overview of non-communicable disease in both developed and developing country settings. Global burden of non-communicable diseases, temporal trends in mortality from cardiovascular diseases, hypertension, diabetic Mellitus, cancer and hepatitis, prevention & control of mental disorder, criticize strategies for prevention of cardiovascular disease.

### **MSBE710: Demography**

The study of demography is important as it allows us to study the nature in which our population changes over time, and this is important as it allows us to study how changes to the population, such as the aging population phenomenon we are witnessing in Pakistan, can lead to a decrease in GDP and also an increase in opportunities.

### **MSBE711: Statistical Methods in Epidemiology**

Statistical measures and concepts underlying the analysis of epidemiological data, analysis of data arising from epidemiological studies using appropriate computer software, investigate confounding and interaction in epidemiological data, issues relevant to case-control and cohort study design.



### **MSBE712: Biostatistics III**

Problems associated with multiple regression and their diagnostic. Dummy variables, Logistic Regression, Poisson Regression, Survival Regression. Multiple and partial correlation, log transformations, and polynomial regression.

### **MSBE713: Survey Sampling Methods**

**Survey Sampling Methods:** Principles and procedures of surveys as applied to the health sciences. Survey and research designs, questionnaire construction, interviewing techniques, sampling techniques, sample-size determination, nonresponse problems. Data collection, evaluation, and presentation of result. Practical experience gained by competing a survey project. Advanced survey design topics, such as survey measures errors and questionnaire scaling techniques.

### **MSBE714: Multivariate Modeling and Advanced Biostatistics**

**Multivariate Modeling:** Analysis of covariance, multivariate analysis of variance, multivariate analysis of covariance, cluster analysis, discernment analysis, Principle component analysis, Factor analysis. Nonparametric survival analysis, proportional hazard model, and the analysis of matched case-control studies.

### **Faculty:**

#### **Present:**

#### **Full time:**

- 1) Prof. Kashif Shafique
- 2) Dr. Abdur Rasheed
- 3) Prof. Zafar Iqbal Hydrie
- 4) Dr. Mansoor Ahmed
- 5) Dr. Waqas Ahmed Farooqui
- 6) Dr. Hira Fatima Waseem
- 7) Dr. Syed Omair Adil
- 8) Dr. Sumair Nasim
- 9) Ms. Nadia Shah
- 10) Ms. Saba Rafique Mughal

#### **Physical requirements:**

- 1) Lecture room
- 2) Office
- 3) Digital Library

**Timing:** Saturday: 3:00 PM to 09:00 PM  
Sunday: 9:00 AM to 6:00PM