



**DIPLOMA IN HEALTH RESEARCH AND  
BIOSTATISTICS**

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## **ROAD MAP OF DIPLOMA IN HEALTH RESEARCH AND BIostatISTICS:**

Shaheed Zulfiqar Ali Bhutto Medical University has launched a one-year Diploma course “Diploma in Health Research and Biostatistics”. First session of this program was started in 2021 with the session of July 2021.

### **COURSE DESCRIPTION:**

This course will provide the learners an in-depth understanding on how to develop research methodology, comprehend basic statistical principles and their application in both quantitative and qualitative research studies in the field of health sciences.

### **TEACHING/LEARNING STRATEGIES**

1. Interactive lectures.
2. Small group discussions.
3. Tutorial practices.
4. Assignment based problem solving exercises.
5. Command on quantitative and qualitative data analysis using SPSS and Nvivo software's.
6. Individual consultations with facilitators for proposal development.

### **PURPOSE OF THE COURSE**

In order to successfully meet the objectives of the course, it is expected that the participant will:

1. Complete pre-reading and preparation required for each session.

2. Attend all sessions.
3. Submit assignments on due dates.
4. Initiate assignment and proposal related discussions in advance.
5. Active participation throughout the course duration.

## **INTRODUCTION TO COURSE CONTENT:**

### **OVERVIEW OF RESEARCH**

At the completion of this unit, the participants will be able to:

1. Define research.
2. Discuss the importance of research in the field of health.
3. Describe general historical trends in research.
4. Describe alternative paths to acquiring knowledge.

### **CONCEPTUALIZING RESEARCH PROBLEMS, PURPOSE AND HYPOTHESIS**

At the completion of this unit, the participants will be able to:

1. Differentiate the research problem from the purpose.
2. Site sources of research problems.
3. Evaluate research problems in terms of significance, research ability and feasibility.
4. Distinguish different types of hypothesis.
5. Examine the use of hypothesis and questions in research.
6. Differentiate between conceptual and operational definitions of variables.

7. Critique statements of problems, purpose, question/hypothesis in research reports.
8. Discuss the process for identifying and locating research sources.
9. Critique the literature review section of a published study.

## **RESEARCH PROPOSAL WRITING**

At the completion of this unit, the participants will be able to:

1. Discuss elements of a research proposal.
2. Discuss guidelines for writing a research proposal.
3. Identify a topic for writing a research proposal.
4. Develop a do-able, practical and descriptive research proposal.

## **INTRODUCTION TO BIOSTATISTICS**

At the completion of this unit, the participants will be able to:

1. Define statistics.
2. Discuss and list several reasons for studying statistics.
3. Distinguish clearly between descriptive and inferential statistics.
4. Identify variable types and variable scales.

## **ORGANIZING AND DISPLAYING DATA**

At the completion of this unit, the participants will be able to:

1. Distinguish between qualitative and quantitative variables, discrete and continuous variables.
2. Distinguish between symmetrical, bimodal, positive, and negative skewed variables.
3. Construct and interpret a frequency table that includes class intervals, class frequency, valid percent and cumulative percent.
4. Indicate the appropriate types of graphs for displaying quantitative and qualitative data.
5. Distinguish which forms of data presentation are appropriate for different situations.
6. Construct a histogram, bar chart, box and whisker plot, scatterplot.
7. Distinguish and interpret various graphs.

### **MEASURES OF CENTRAL TENDENCY**

At the completion of this unit, the participants will be able to:

1. Compute and distinguish between the uses of measures of central tendency: mean, median and mode.
2. Compute and list uses for measures of variation: range, variance and standard deviation.
3. Compare sets of data by computing their coefficients of variation.
4. Identify and compute the mean and standard deviation for grouped and un-grouped data.
5. Understand the distinction between population mean and sample mean.

## **SAMPLING METHODOLOGIES**

At the completion of this unit, the participants will be able to:

1. Define the term 'sampling'.
2. Recognize the use of sampling in research studies.
3. Identify the different types of sampling.
4. Discuss the concepts of validity and reliability.

## **THE NORMAL DISTRIBUTION**

At the completion of this unit, the participants will be able to:

1. Identify the importance of normal distribution.
2. Identify the properties of normal distribution.
3. Identify the mean and the standard deviation in the context of normal distribution.
4. List the differences between the normal and standard normal distribution.

## **T-TEST, CHI-SQUARE TESTS, CONTINGENCY TABLES, REGRESSION, ODDS RATIOS**

At the completion of this unit, the participants will be able to:

1. Identify and explain the procedure for a test of significance between two sample means.
2. Indicate and apply relevant tests to respective data sources and types.
3. Interpret and properly narrate the findings of relevant tests in text and graphical format for publication.
4. Understand and apply the requisite statistical model as dictated by the dataset available.

5. Be able to use statistical software (SPSS) independently and confidently as per study requirements.

## **HYPOTHESIS TESTING**

At the completion of this unit, the participants will be able to:

1. Identify and explain the procedure for a test of significance.
2. Explain the meaning of a null hypothesis and alternative hypothesis.
3. Define statistical significance.

## **QUANTITATIVE RESEARCH DESIGNS**

At the completion of this unit, the participants will be able to:

1. Define the relationship of the research problem, question/hypothesis and framework to the study design.
2. Describe the characteristics of experimental, quasi experimental and non-experimental designs.
3. Identify several specific quantitative research designs including epidemiological designs and action research.
4. Compare and contrast the various types of design validity.
5. Describe the elements of a good design.
6. Critique the design of a quantitative research study.



## **ETHICS IN RESEARCH**

At the completion of this unit, the participants will be able to:

1. Identify the historical context for the development of ethical codes.
2. Define three ethical principles necessary for conducting research.
3. Discuss human rights that require protection in research.
4. Describe the informed consent process.
5. Define the function of institutional review boards.
6. Examine the risk benefit ratio of studies conducted in clinical agencies.
7. Critique the ethical information provided in a published study.

## **INTRODUCTION TO QUALITATIVE RESEARCH DESIGN**

At the completion of this unit, the participants will be able to:

1. Compare and contrast qualitative and quantitative research.
2. Examine the research process used in grounded theory, ethnography, historical research, phenomenal research and case study.
3. Describe the scientific rigor associated with qualitative research.
4. Critique the components of a qualitative study.
5. Describe the various types of triangulations.

## **DURATION OF COURSE:**

Total duration of this course will be One year, spread over two-days contact sessions every six weekly and a Total of 18 Contact Sessions will be held for this course.

## **AIMS AND OBJECTIVES:**

### **AIMS OF THE COURSE:**

The aim of this course is to develop practical skills in formulating research questions and using the appropriate research methodology with suitable plan and analysis of the data collected. The primary focus shall be on understanding the rules governing descriptive and inferential biostatistics to collect, analyze and interpret relevant data in the field of medical sciences.

### **LEARNING OBJECTIVES**

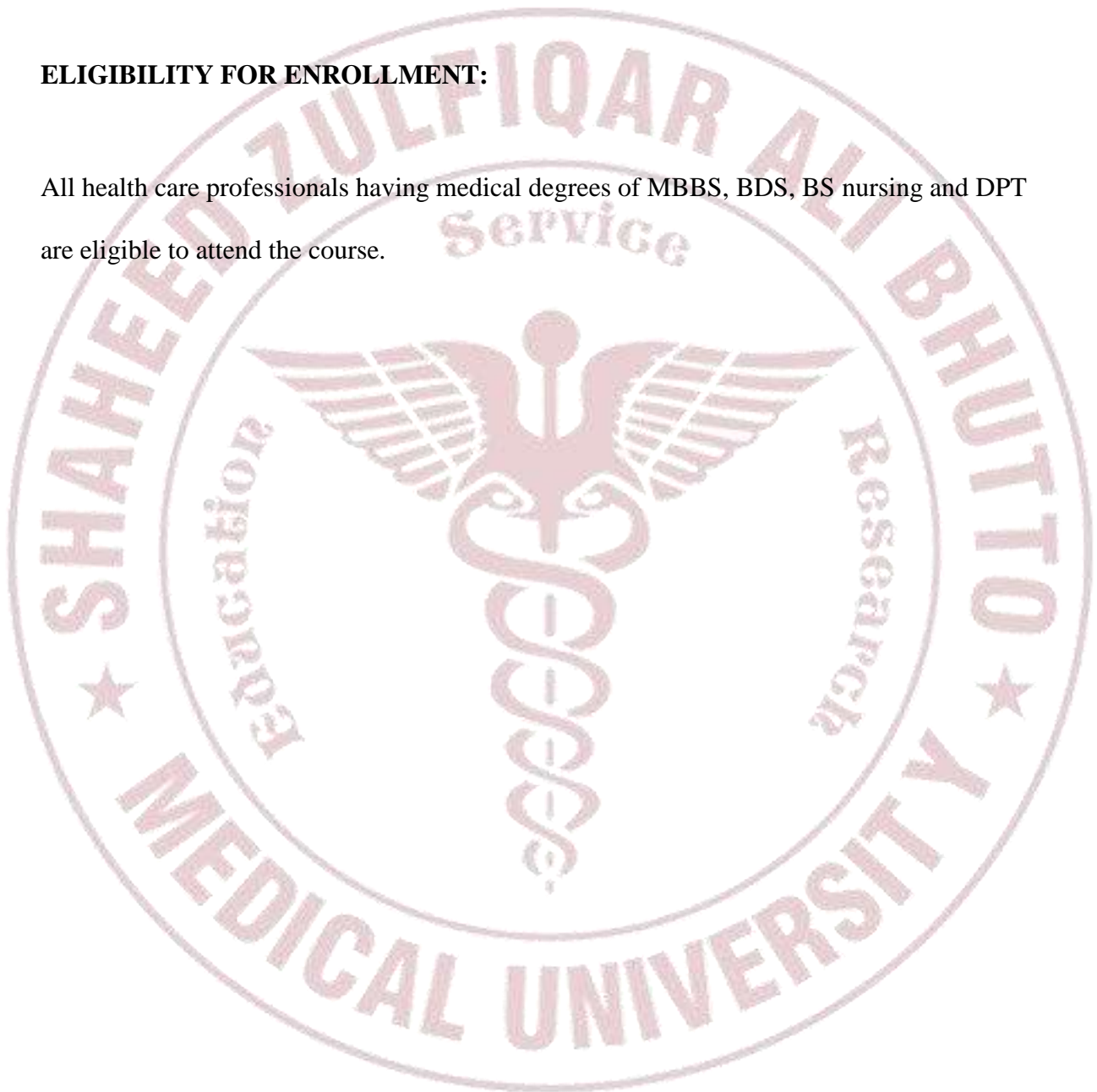
On completion of this course, participants will be able to:

1. Define various statistical terms.
2. Explain the various statistical methods used in health sciences.
3. Analyze the use of statistics in relevant research studies.
4. Utilize descriptive and inferential statistics in different disciplines.
5. Develop research questions and formulate hypotheses.
6. Review existing literature by using different databases.
7. Recognize the research process as a systematic approach to thought that generates knowledge in health sciences.
8. Explore health related problems that can be translated into a research project.

9. Utilize ethical considerations and regulations used in the protection of human subjects and the conduct of research.
10. Develop individual research proposals for future research.

**ELIGIBILITY FOR ENROLLMENT:**

All health care professionals having medical degrees of MBBS, BDS, BS nursing and DPT are eligible to attend the course.

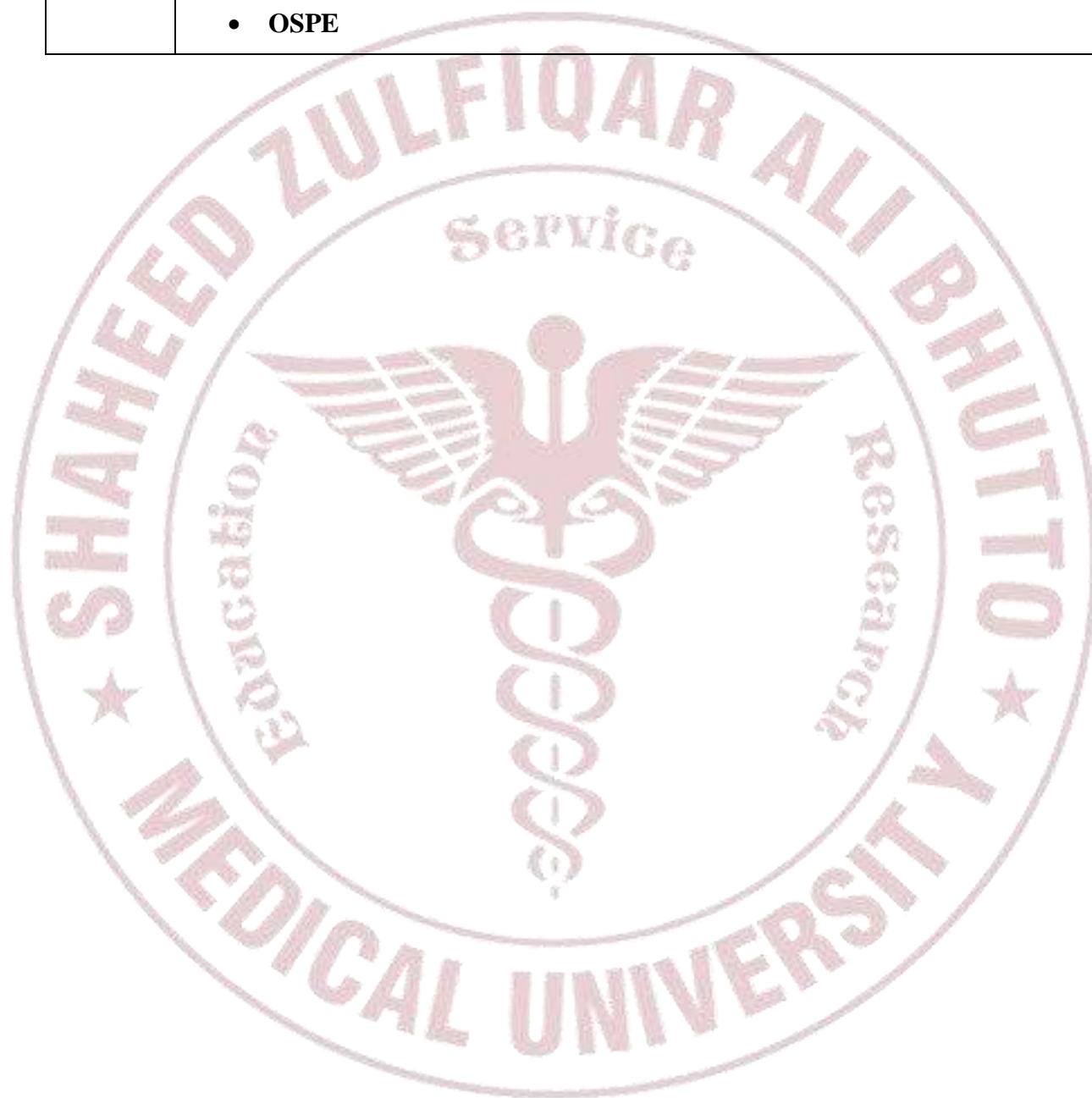


## CONTENT OF LEARNING:

	<b>COURSE CONTENT</b>
	<b>OVERVIEW OF RESEARCH</b>
4.1	<ul style="list-style-type: none"><li>• Conceptualizing research problem, purpose and hypothesis</li></ul>
4.2	<ul style="list-style-type: none"><li>• Ethics in Research</li></ul>
4.3	<ul style="list-style-type: none"><li>• Quantitative Research Design</li></ul>
4.4	<ul style="list-style-type: none"><li>• Introduction to Qualitative Research</li></ul>
4.5	<ul style="list-style-type: none"><li>• Synopsis Writing, Dissertation writing, Thesis writing</li></ul>
4.6	<ul style="list-style-type: none"><li>• Plagiarism in Medical Writing</li></ul>
4.7	<ul style="list-style-type: none"><li>• Literature Review</li></ul>
4.8	<ul style="list-style-type: none"><li>• Applying and winning a research Grant</li></ul>
4.9	<ul style="list-style-type: none"><li>• Introduction to Biostatistics</li><li>• Sampling Techniques (Probability and non-probability sampling)</li><li>• Data types (Quantitative, qualitative)</li><li>• Organizing and display of data (Graphical Techniques)</li></ul>
4.10	<ul style="list-style-type: none"><li>• Measure of central tendency (Mean, median, mode)</li><li>• Measures of Variation (Range, Variance, SD, IQR, centiles, percentiles)</li><li>• Estimation with Confidence interval (for mean and proportions)</li><li>• Types of statistical errors (Type I, and Type II errors)</li><li>• Normal distribution</li><li>• Outliers in data</li></ul>
	<b>Inferential statistics</b>

4.11	<ul style="list-style-type: none"> <li>• Parametric and non-parametric statistics</li> <li>• Assumptions of the parametric tests</li> <li>• Hypothesis testing <ul style="list-style-type: none"> <li>○ Types of t-test,</li> <li>○ ANOVA test</li> </ul> </li> </ul>
4.12	<ul style="list-style-type: none"> <li>• Chi-square test</li> <li>• Odds ratio and Relative risk</li> <li>• Non-parametric tests <ul style="list-style-type: none"> <li>○ Mann-Whitney test</li> <li>○ Wilcoxon signed rank test</li> <li>○ Kruskal-Wallis test</li> </ul> </li> <li>• Lambda Test</li> <li>• Kendall's Tau b test</li> <li>• McNemar test</li> </ul>
4.13	<p><b>APPLICATION OF STATISTICAL TOOLS WITH SPSS.</b></p> <ul style="list-style-type: none"> <li>• Data entry in SPSS</li> </ul>
4.14	<ul style="list-style-type: none"> <li>• Data management in SPSS (Split File, Select Cases)</li> <li>• Transform data in SPSS (Compute variable, Recode Variables)</li> <li>• Descriptive analysis with SPSS (Measures of central tendency and variation, Graphs)</li> <li>• Testing of assumptions for parametric data with SPSS</li> <li>• Inferential analysis with SPSS (parametric and non-parametric significance tests)</li> </ul>
4.15	<p><b>Correlation and Regression Analysis</b></p> <ul style="list-style-type: none"> <li>• Correlation</li> <li>• Linear Regression</li> </ul>
4.16	<ul style="list-style-type: none"> <li>• Multiple linear Regression</li> <li>• Logistic Regression</li> <li>• Survival Analysis (Kaplan-Meier estimate, Log-rank test)</li> <li>• Cox Regression</li> <li>• Correlation and regression analysis with SPSS</li> </ul>
4.17	
4.18	<ul style="list-style-type: none"> <li>• Qualitative Research</li> </ul>

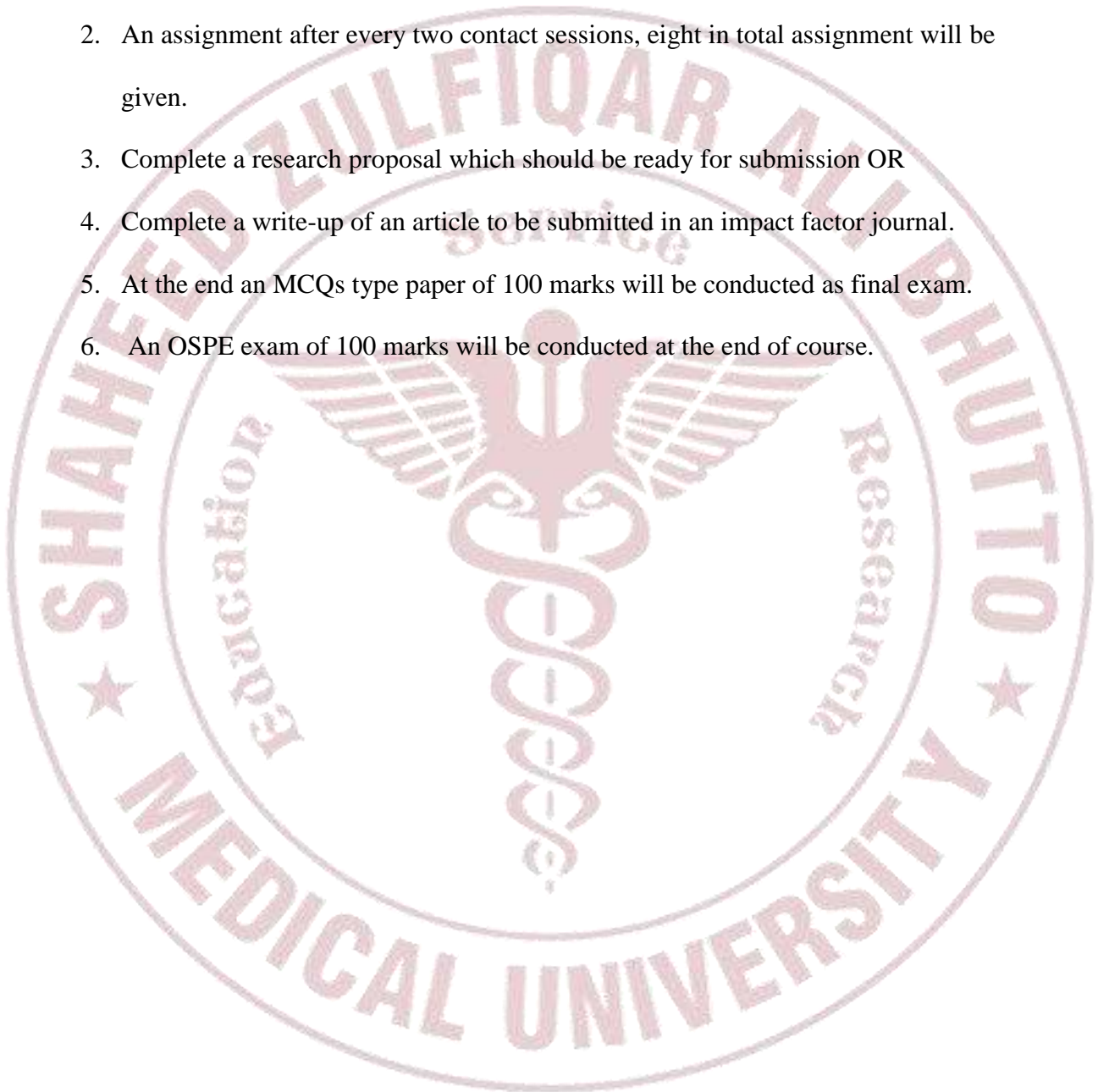
	<ul style="list-style-type: none"> <li>• Qualitative research analysis using N vivo</li> </ul>
4.19 4.20	<p><b>ASSESSMENT</b></p> <ul style="list-style-type: none"> <li>• Scrutiny of assignments</li> <li>• MCQs Exam</li> <li>• <b>OSPE</b></li> </ul>



## ASSESSMENT CRITERIA

By the end of the course, participants are expected to:

1. Ensure 100% attendance in all contact sessions.
2. An assignment after every two contact sessions, eight in total assignment will be given.
3. Complete a research proposal which should be ready for submission OR
4. Complete a write-up of an article to be submitted in an impact factor journal.
5. At the end an MCQs type paper of 100 marks will be conducted as final exam.
6. An OSPE exam of 100 marks will be conducted at the end of course.



**COURSE STRUCTURE/PROPOSAL**

**COURSE TITLE:** DIPLOMA IN HEALTH RESEARCH AND  
BIostatISTICS

**COURSE DURATION:** ONE YEAR, SPREAD OVER TWO DAYS  
CONTACT SESSIONS EVERY SIX WEEKLY  
(TOTAL 18 CONTACT SESSIONS)

**SESSION TIMINGS** 09:00AM TO 2:00PM

**ELIGIBILITY CRITERIA** Health Care Professionals having Medical  
Degrees of MBBS, BDS, BS Nursing and DPT

**PROPOSED NUMBER OF PARTICIPANTS** 20 CANDIDATES

**FEE OF COURSE** PKR 120,000



## COURSE FACULTY

1. DR. FIBHA SYED	7. MR YASEEN MEENAI (IBA KHI)
2. DR. ALI ARIF	8. DR. JAFAR BIN BAQIR
3. DR. JUNAIDA SARFRAZ	9. DR. ZAHOOR SARWAR (IST, Islamabad)
4. DR. NIGHAT	10. DR. MOHSIN SHAHZAD
5. MR. MUHAMMAD AFZAL	11. DR. FAROOQ AHMED SOD, SZABMU
6. DR. LAKIS LILOGLOU Edge Hill University, UK	12. DR. PHILIP WELSBY, Edge Hill University, UK

## **BUDGET ALLOCATION**

**TOTAL REVENUE (12 x 120,000 = 1440,000 + 12000 processing fee = 1452,000)**

University Share (20% = **290,400**)

Logistics/ Costs (10,000/DAY = **140,000**)

Refreshment Cost = (15000 x 14 = **210,000** )

Faculty Honoraria (Pkr 20,000 per Session, Total = 20,000 x 14 = **280,000** )

International Faculty Honoraria (Pkr 40,000 per Session, Total = 40,000 x 4 = **160,000**)

Two Tickets from – to Karachi = (Pkr 40,000 x 2 = **80,000**)

Residential cost of Two Facilitators = (15000 x 4 = **60,000**)

Coordinators Honorarium = (4 x 50000 = **200,000**)

Final Assessment = (Pkr **30,000**)

IT SUPPORT COST = (Pkr **25,000**)

**TOTAL COST = (Pkr 1465,400)**

**Minimum of Candidate to run the course  $\cong$  12-13**