INTERNATIONAL MEDICAL UNIVERSITY
MALAYSIA

MSc Public Health (Open Distance Learning)

MScPH 104

Biostatistics

(4 Credits)

Module Guide

TITLE: Biostatistics **COURSE CODE: MScPH 104**

SEMESTER 1 / 2

PROGRAMME: MSc Public Health (ODL)

CONTENT SYNOPSIS:

The module introduces the concepts of statistics for health professionals. Students learn to calculate basic statistical parameters and interpret statistical data. Projects are incorporated to allow the students to gain hands-on experience with the collection of data preparation of questionnaire and applications of statistics in data analysis. They will also be trained in the use of the SPSS statistical analysis package.

LEARNING OUTCOMES:

At the completion of this course, the students shall be able to achieve the following outcomes:

CLO 1	Identify the different types of variables
CLO 2	Be able to construct graphical and numerical summaries of data.
CLO 3	Explain the concept of central tendency and dispersion
CLO 4	Explain the concept and application of normal distribution
CLO 5	Discuss the concept of inferential statistics
CLO 6	Explain the different types of statistical tests
CLO 7	Use the appropriate statistical test to answer a research question
CLO 8	Interpreted the results of statistical analysis
CLO 9	Identify the different techniques of sampling.
CLO 10	Use SPSS statistical package to carry out statistical analysis
CLO 11	Appreciate the importance of statistics in medicine.
CLO 12	Appreciate the importance of SPSS in statistical analysis

TRANSFERABLE SKILLS:

- Able to apply the statistical concept in designing the public health study.
- Able to describe, analyse and interpret the information obtain from the study.
- Able to critically appraise the research articles.

TOTAL STUDENT LEARNING TIME (SLT):

SLT	Face to Face				Online				Total Student Learning Time (TSLT)
	L	T	P	O	L	T	P	O	
L=Lecture T=Tutorial P-Practical O=Others			40		60	60			160

ASSESSMENTS:

In –course Assessment	40%
End of Module Assessment	60%

MODULE COORDINATOR: Dr Lwin Mie Aye
ASSOCIATED LECTURERS: Associate Professor Dr Chandrashekhar

SYLLABUS:

Unit 1: Introduction

1.1 Introduction to Biostatistics *(Lecture - 50 mins)*

a. Important terms and definitions
b. Population, Samples, Variables
c. Random Sampling

Unit 2: Descriptive Statistics

2.1 Data Presentation *(Lecture - 60 mins)*

a. Raw data and Grouped data
b. Tables, Charts, Boxplots, Stem & Leave

2.2 Data Editing and Presentation *(In-course assessment)*

2.3 Measures of Central Tendency *(Lecture - 50 mins)*

a. Mean, median & mode for raw data
b. Mean, median & Mode for grouped data
c. Quartiles and percentiles

2.4 Measures of Dispersion *(Lecture - 60 mins)*

a. Range and Inter-quartile Range
b. Standard Deviation and Variance

2.5 Descriptive Statistics *(In-course assessment)*

2.6 Normal Distribution and Transformation *(Lecture - 65 mins)*

a. Types of Distributions
b. Normal Distributions
c. Standard Normal Distribution
d. Skewness and Kurtosis
e. Area under the Curve

2.7 Normal Distribution and Transformation *(In-course assessment)*

2.8 Sampling Distribution and Probability *(Lecture - 45 mins)*

a. Sampling Distribution and Standard Error
b. Elementary Probability Theory

2.9 Sampling *(Lecture - 60 mins)*

a. Sampling Techniques
b. Random Sampling Chart

2.10 Sample Size Estimation *(Lecture - 60 mins)*

a. Purposes
b. Statistical concepts
c. Sample size calculation

Unit 3: Inferential Statistics

3.1 Hypothesis Testing and Confidence Interval *(Lecture - 110 mins)*

a. Statistical Significance and Probability
b. Testing for Statistical Significant
c. Confidence Level and Accuracy
d. Statistical Significance and Practical Importance
e. Type I and Type II Error

3.2 Confidence Interval *(In-course assessment)*

3.3 Describing a Population (One Sample Test) *(Lecture - 40 mins)*

a. Parametric and Nonparametric Tests
b. Z-test for population proportion
c. Chi-square Goodness of Fit
d. t-test for population mean

3.4 One Sample Test *(In-course assessment)*

3.5 Comparing Differences in Mean between Two or More Populations *(Lecture - 60 mins)*

a. Independent Sample t-test
b. Paired Sample t-test
c. One-way ANOVA (Analysis of Variance)

3.6 Comparing Differences in Proportions for Two or More Population *(Lecture – 40 mins)*

a. Chi-square Test of Independence
b. Chi-square Test for Differences between More than Two Proportions (Dependent variable has two categories)
c. Chi-square Test of Independence (Dependent Variable has more than Two Categories)

3.7 Two Sample t-test *(In-course assessment)*

3.8 Nonparametric Tests *(Lecture - 60 mins)*

a. Wilcoxon Signed Rank Test
b. Mann Whitney U Test/ Wilcoxon Rank Sum Test
c. Kruskal-Wallis test
d. Spearman's rank correlation test (added subtopic)

3.9 Determining Relationship between Variables (Measured at Interval Level) *(Lecture - 60 mins)*

e. Pearson Correlation and Significant Test
f. Simple Linear Regression and Significant Test

3.10 Analysing Relationship *(In-course assessment)*

3.11 Determining Relationship between Variables (Measured at Nominal Level) *(Lecture - 50 mins)*

a. Contingency table
b. Relative Risk and Odds Ratio

3.12 Relative Risk & Odds Ratio *(In-course assessment)*

3.13 Multivariate Analysis *(Lecture - 100 mins)*

a. Multiple Logistic Regression
b. Multiple Linear Regression

3.14 Multivariate Analysis *(In-course assessment)*

Unit 4: Practical

4.1 Statistical Computing using SPSS *(Cal session)*

a. Introduction to SPSS Software
b. Descriptive Statistics
c. Inferential Statistics

Unit 5: End of Module Assessment

RECOMMENDED TIMELINE TO COMPLETE THE MODULE

UNIT	SUBUNIT	Topic	Week
Unit 1: Introduction	1.1	Introduction to Biostatistics	1
Unit 2: Descriptive Statistics	2.1	Data Presentation	1
	2.2	Assessment (Data Editing and Presentation)	
	2.3	Measures of Central Tendency	2
	2.4	Measures of Dispersion	
	2.5	Assessment (Descriptive Statistics)	
	2.6	Normal Distribution & Transformation	3
	2.7	Assessment (Normal Distribution and Transformation)	
	2.8	Sampling Distribution & Probability	4
	2.9	Sampling	
	2.10	Sampling Size Estimation	
	2.11	Assessment (Sample Size Calculation)	
Unit 3: Inferential Statistics	3.1	Hypothesis Testing and Confidence Interval	5
	3.2	Assessment (Confidence Interval)	
	3.3	Describing a Population (One Sample Test)	
	3.4	Assessment (One sample test)	
	3.5	Comparing Differences in Mean between Two or More Populations	6
	3.6	Comparing differences in Proportions for Two or More Populations	
	3.7	Assessment (Two samples *t*-test)	
	3.8	Nonparametric Tests	7
	3.9	Determining Relationship between Variables (Measured at interval level)	
	3.10	Assessment (Analysing relationship)	
	3.11	Determining relationship between variables (Measured at nominal level)	8
	3.12	Assessment (Relative Risk & Odds ratio)	
	3.13	Multivariate Analysis	
	3.14	Assessment (Multivariate Analysis)	
Unit 4: Practical	4.1	Statistical Computing using SPSS	9
Unit 5: End of Module Assessment	5.1	Hypothesis testing, Data analysis and interpretation	10