



Course Specifications

Course Title:	Basics of Biostatistics & Epidemiology
Course Code:	BEP235
Program:	Bachelor of Medicine, Bachelor of Surgery (MBBS)
Department:	NA
College:	College of Medicine
Institution:	Alfaisal University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	6
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	7
G. Course Quality Evaluation	7
H. Specification Approval Data	8

A. Course Identification

1. Credit hours: 2 (1+2+0)
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Sem 3, Year 2
4. Pre-requisites for this course (if any): Sem 1 and 2
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	16	33%
2	Tutorial	32	67%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	16
2	Laboratory/Studio	
3	Tutorial	32
	Total	48

B. Course Objectives and Learning Outcomes

1. Course Description

This is an introductory course for second-year medical students on the basic principles of biostatistics and epidemiology. It includes topics such as descriptive, graphical, and numerical measures, probability concepts, hypothesis testing and confidence interval estimation, one- and two-sample *t*-tests, analysis of variance (ANOVA), correlation analysis, and sampling techniques. In addition, basic epidemiologic principles, including diagnostic tests, relative risk and odds ratio are covered.

2. Course Main Objective

At the end of the course students should be able to use and apply the basic principles of biostatistics and epidemiology. Students should be able to interpret data, apply the principles of probability theory, construct hypothesis and test it. They should have a good understanding of excel and other statistical software packages to conduct basic data analysis and prepare for the presentation of results.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Define basic biostatistical and epidemiologic terms including sample, and population.	PLO29
1.2	Describe the measures of central tendency and dispersion.	PLO29
1.3	Distinguish between nominal, ordinal, and interval types of measurement and state which statistical tests are appropriate for each type of measurement.	PLO29
1.4	Explain the fundamentals of the probability theory.	PLO29
1.5	Distinguish between null and alternative hypotheses, state the basic steps of hypothesis testing, and interpret confidence levels.	PLO29
1.6	List and describe the basic characteristics of common distributions for continuous data.	PLO29
1.7	Identify applications where nonparametric tests are appropriate.	PLO29
1.8	Recognize the differences between parametric and nonparametric tests.	PLO29
1.9	Describe sampling techniques and their use in medical research.	PLO29
1.10	Acquire the basic terminology used in epidemiology.	PLO29
2	Skills :	
2.1	Summarize datasets and present such summaries using descriptive statistics.	PLO29
2.2	Conduct hypothesis tests and interprets their level of significance.	PLO29
2.3	Apply basic probability concepts, e.g., diagnostic tests, relative risk, odds ratio.	PLO29
2.4	Construct and interpret confidence intervals.	PLO29
2.5	Perform basic sampling techniques.	PLO29
2.6	Create a random sample using different statistical techniques.	PLO29
2.7	Perform parametric and non-parametric correlation analysis techniques.	PLO29
2.8	Use basic other nonparametric statistical techniques in data analysis.	PLO29
2.9	Apply basic epidemiological concepts such as diagnostic tests, relative risk, and odds ratio and interpret the results.	PLO29
2.10	Compare means using t-test and analysis of variance (ANOVA) techniques.	PLO29
3	Values:	
3.1	Adhere to the attendance policy.	
3.2	Maintain professional conduct with colleagues, faculty and staff.	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Biostatistics and Epidemiology and Basic Definitions	3
2	Data Presentation and how to Avoid the Misuse of Statistics	3
3	Numerical Summary Measures	3
4	Introduction to Epidemiology I: Rates and Standardization	3
5,6	Introduction to the Theory of Probability	6
7	Probability Distributions	3

8	Sampling Distribution of the Mean	3
9	Confidence Intervals	3
10	Hypothesis Testing	3
11	Comparison of Two Means	3
12	Analysis of Variance	3
13	Correlation Analysis	3
14	Introduction to Sampling Theory	3
15	Nonparametric Methods	3
16	Introduction to Epidemiology - II	3
Total		48

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Describe the measures of central tendency and dispersion.	Lectures	Summative assessments
1.2	Describe different sampling techniques and their use in medical research.	Lectures	Summative assessments
1.3	Recognize the differences between parametric and nonparametric tests.	Lectures	Summative assessments
1.4	Define basic biostatistical and epidemiologic terms including sample, population.	Lectures	Summative assessments
1.5	Explain the fundamentals of the probability theory including hypothesis testing.	Lectures	Summative assessments
1.6	Distinguish between nominal, ordinal, and interval types of measurement and state which statistical tests are appropriate for each type of measurement.	Lectures	Summative assessments
1.7	List and describe the basic characteristics of common distributions for continuous data.	Lectures	Summative assessments
1.8	Distinguish between null and alternative hypotheses, state the basic steps of hypothesis testing, and interpret confidence levels.	Lectures	Summative assessments
1.9	Identify applications where nonparametric tests are appropriate.	Lectures	Summative assessments
1.10	Acquire the basic terminology used in epidemiology.	Lectures	Summative assessment
2.0	Skills		
2.1	Summarize datasets and present such summaries using descriptive statistics techniques	Lecture and labs	Formative and summative assessment

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Conduct hypothesis tests, and interpret their level of significance	Lecture and labs	Formative and summative assessment
2.3	Apply basic probability concepts, e.g., diagnostic tests, relative risk, odds ratio	Lecture and labs	Formative and summative assessment
2.4	Construct and interpret confidence intervals	Lecture and labs	Formative and summative assessment
2.5	Perform basic sampling techniques	Lecture and labs	Formative and summative assessment
2.6	Create a random sample using different statistical techniques.	Lecture and labs	Formative and summative assessment
2.7	Perform correlation analysis techniques	Lecture and labs	Formative and summative assessment
2.8	Use basic non-parametric statistical techniques in data analysis	Lecture and labs	Formative and summative assessment
2.9	Apply basic epidemiological concepts such as diagnostic tests, relative risk, and odds ratio	Lecture and labs	Formative and summative assessment
2.10	Compare means using t-test and analysis of variance (ANOVA) techniques.	Lecture and labs	Formative and summative assessment
3.0	Values		
3.1	Adhere to the attendance policy.		Continuous assessment
3.2	Maintain professional conduct with colleagues, faculty and staff.		Continuous assessment

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Project	Weekly	15
2	Midterm Exam	9	25
3	Final Exam	18	60

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

The CoM program established its own mentorship program that employs all full-time faculty as mentors. Through this program, every medical student in the program is assigned a mentor at the beginning of their first semester of studies. The program has a broad scope covering academic advising and counseling. The mentors handle all aspects related to academic

advising, including academic planning, academic performance review, and advice on course drop or withdrawal, study skills, and time management.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Principles of Biostatistics (2 ND Edition) by M. Pagano and K Gaureau, Duxbury Press, 2000. ISBN: 0-534-22902-6
Essential References Materials	<ol style="list-style-type: none"> 1. Statistical Methods in Epidemiology by H. A. Kahn and C.T. Sempos. Oxford University Press. 1989. ISBN 0-19-505751-1. 2. Biostatistics for the Health Science. C.R. Blair and R.A. Taylor. Pearson Education, Inc. 2008. ISBN: 0-13-117660-9 3. Medical Uses of Statistics by JC Bailar III and F. Mosteller. 2nd Edition. NEJM Books, Boston, MA. ISBN: 0-910133-36-0. 4. Conover, W. J. (1980). Practical nonparametric statistics, 2nd Edition. New York: John Wiley and Sons. 5. Siegel, Sidney & N. J. Castellan (1988). Nonparametric statistics for the behavioral sciences. New York: McGraw-Hill
Electronic Materials	<ul style="list-style-type: none"> • American Statistical Association (ASA) http://www.amstat.org/ • Center for Disease Control (CDC) http://www.cdc.gov/ • World Health Organization (WHO) http://www.who.int/en/ • American Public Health Association (APHA) http://www.apha.org/ • Infectious Diseases Society of America (IDSA) http://www.idsociety.org/
Other Learning Materials	SPSS Inc. (1999). SPSS Base 10.0 for Windows User's Guide. SPSS Inc., Chicago IL.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, Examination Facilities
Technology Resources (AV, data show, Smart Board, software, etc.)	AV (Audio-Visual), Smartboard, Moodle (E-learning Management)
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course and Faculty Evaluation Survey	Students	Survey

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	