

Course Specifications

Course Title:	Epidemiology and Biostatistics for Nursing
Course Code:	56024505-2
Program:	Bachelor's degree in nursing program
Department:	Community Nursing and Healthcare
College:	College of Nursing
Institution:	Umm AL-Qura University







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A. Course Identification

1. Credit hours:			
2. Course type			
a. University College Department 🖌 Others			
b. Required 🖌 Elective			
3. Level/year at which this course is offered: 1^{st} Semester -4^{th} Year			
4. Pre-requisites for this course (if any):			
Medical English Language			
5. Co-requisites for this course (if any):			
NA			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	90%
2	Blended	NA	
3	E-learning	NA	
4	Distance learning	NA	
5	Other	NA	

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	NA
3	Tutorial	NA
4	Others (specify)	NA
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to help students develop essential knowledge and skills in quantitative nursing research by integrating the core disciplines of epidemiology and biostatistics in one course. This course will enable the students to apply an epidemiological approach to the study of disease and illness. This course will help in interpreting and assessing the evidence quality of a range of study designs and to apply appropriate statistical technique in the analysis of health data.

The course will cover basic concepts in epidemiology such as prevalence, incidence, relative risk, odds ratio and research design; and basic concepts in biostatistics which covers introduction to descriptive statistics, hypothesis testing and confidence intervals, analysis of categorical and continuous data and regression analysis.

2. Course Main Objective

Upon completion of this course, the student will be able to:

- Understand the role of biostatistics in nursing studies. •
- Use descriptive tools to summarize and display data from nursing studies. •
- Identify appropriate tests to perform hypothesis testing, and interpret the outputs adequately; •
- Get familiar with statistical software and standard packages for biostatistics. •
- Understand the fundamental concepts of epidemiology and its role in nursing research •
- Calculate key measures of disease occurrence, association, and health impact. •
- Apply epidemiological principles to identify individuals and groups at risks for disease. •
- Utilize descriptive epidemiology to explore health problems on populations. ٠
- Understand the principles of various study designs, and explain their advantages and • limitations;

3. Course Learning Outcomes			
	CLOs	Aligned PLOs	
1	Knowledge and Understanding		
1.1	Reflect comprehensive understanding of the purpose and goals of	1.2	
	Epidemiology and its use		
1.2	Discuss the application of epidemiology principles in quantitative nursing research	1.2	
1.3	Define a range of measures of frequency of disease, including prevalence, incidence, odds and rates	1.2	
1.4	Define and describe the epidemiological principles of descriptive, ecological, cross-sectional, case-control and cohort studies; randomized controlled.	1.2	
1.5	Reflect comprehensive understanding of the concept of Biostatistics and its	1.2	
	role in nursing		
1.6	Describe statistical methods and their application in nursing research	1.2	
1.7	Identify different data structures (e.g. types of variables and levels of	1.2	
	measurement) and distribution characteristics of variables and distinguish		
	between the concepts descriptive and inferential statistics.		
1.8	Estimate population dynamics using samples	1.2	
1.9	Explain hypothesis testing	1.2	
1.10	Identify appropriate data display techniques to present analyzed data	1.2	
2	Skills:		
2.1	Use basic statistical methods, such as descriptive statistics, graphical plots,	2.5	
	hypothesis testing, t-test, ANOVA models, and linear regression models, to		
	analyze real world problems arising in nursing science		
2.2	Distinguish, calculate, and interpret measures of occurrence of diseases,	2.5	
	including prevalence, incidence, and odds of disease.		
2.3	Distinguish, calculate, and interpret measures of association, including odds	2.5	
	ratio, relative risk, and risk difference.		

	CLOs	Aligned PLOs
2.4	Distinguish and interpret several study designs, including observational and experimental study design.	2.5
2.5	Construct contingency tables for study designs and analyze data from contingency tables.	2.5
2.6	Use a standard statistical software, such as Excel or SPSS, to implement the statistical methods in this course.	2.5
2.7	Analyse health data using statistical software and interrogate the test assumptions and interpret the results of computer-generated statistical analyses.	2.5
2.8	Read, analyze and interpret the result of scientific research	2.5
3	Values:	
3.1	Develop self-learning	3.2
3.2	Reconstruct proposed solution to any problem based on the acquired knowledge and skills.	3.2
3.3	Develop the skills of critical thinking in class discussion.	3.2

C. Course Content

No	List of Topics	
1	Introduction to biostatistics & level of measurement	2
	Descriptive statistics (part1)	
2	• Describing quantitative data with numbers: measures of central tendency and variability	2
	• Describing qualitative data with numbers: frequency, proportion/percent	
	Descriptive statistics (part2)	
3	• Describing quantitative data with graphs: dot plot, histogram, line diagram	2
	• Describing qualitative data with graphs: bar chart, pie chart, dot plot	
	Statistical inference	
	• Probability and probability distribution;	
4	• Statistics versus parameters;	2
	• Sampling variability;	
	• Standard error.	
	Scientific hypothesis testing	
	• Statistical significance and other types of significance;	
5	• Levels of significance;	2
	• Type I and Type II errors;	
	• Confidence intervals.	
6	Statistical analysis of categorical variables & proportions	
0	• Chi-square tests	2
7	Statistical analysis for comparing means (part 1)	2
/	• t-test (one sample, dependent and independent sample test)	2
8	Statistical analysis for comparing means (part 2)	2

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	Analysis of variance (ANOVA)	
	Correlations and simple linear regression	
0	• Scatter plots;	2
2	• Coefficients and their interpretations.	2
	Simple Linear Regression.	
	Introduction to epidemiology	
10	• The history and scope of epidemiology	2
	Practical applications of epidemiology	
	Measures of morbidity and mortality used in epidemiology	
11	• Concept and calculation of Prevalence and Incidence, mortality	2
	standardization	
	Natural history of disease	
12	 Natural history of disease; disease transmission& progression 	2
	• Distinguish cause from chance; scientific guidelines for causation	
13	Screening for disease in the community	2
15	• Assessing validity and reliability of diagnostic and screening tests	
	Research design (part1)	
	Observational study design	
	a. Ecological	
14	b. Case-report/Case-series	2
	c. Cross-sectional	
	d. Case-control	
	e. Cohort	
	Research design (part2)	
	• Experimental study design	
15	a. Randomized Controlled Trials (RCT)	2
	b. Quasi-experimental	
	Systematic reviews and meta-analysis	2.2
	Total	30

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	0	
1.1	Reflect comprehensive understanding of the	• Lecturing	• Midterm and
	purpose and goals of Epidemiology and its use	Open discussion	final exams
		• Group	• Assignments
		discussion	Class
		• Use of the	participation
		internet and the	• In class short
		library	MSQ quizzes
1.2	Discuss the application of epidemiology	• Lecturing	• Midterm and
	principles in quantitative nursing research	Open discussion	final exams

Code	Course Learning Outcomes	Teaching	Assessment
		Strategies	Methods
		 Group discussion Use of the internet and the library 	 Assignments Class participation In class short MSQ quizzes
1.3	Define a range of measures of frequency of disease, including prevalence, incidence, odds and rates	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.4	Define and describe the epidemiological principles of descriptive, ecological, cross- sectional, case-control and cohort studies; randomized controlled.	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.5	Reflect comprehensive understanding of the concept of Biostatistics and its role in nursing	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.6	Describe statistical methods and their application in nursing research	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.7	Identify different data structures (e.g. types of variables and levels of measurement) and distribution characteristics of variables and distinguish between the concepts descriptive and inferential statistics.	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.8	Estimate population dynamics using samples	 Lecturing Open discussion Group discussion 	Midterm and final examsAssignments

Code	Course Learning Outcomes	Teaching	Assessment
Coue	Course Learning Outcomes	Strategies	Methods
		• Use of the internet and the library	Class participation In class short MSQ quizzes
1.9	Explain hypothesis testing	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
1.10	Identify appropriate data display techniques to present analyzed data	 Lecturing Open discussion Group discussion Use of the internet and the library 	 Midterm and final exams Assignments Class participation In class short MSQ quizzes
2.0	Skills		
2.1	Use basic statistical methods, such as descriptive statistics, graphical plots, hypothesis testing, t- test, ANOVA models, and linear regression models, to analyze real world problems arising in nursing science	 Lecturing Interactive learning Use of statistical software Use of the internet and the library 	AssignmentsPractical exam
2.2	Distinguish, calculate, and interpret measures of occurrence of diseases, including prevalence, incidence, and odds of disease.	 Lecturing Interactive learning Use of the internet and the library 	AssignmentsPractical exam
2.3	Distinguish, calculate, and interpret measures of association, including odds ratio, relative risk, and risk difference.	 Lecturing Interactive learning Use of the internet and the library 	AssignmentsPractical exam
2.4	Distinguish and interpret several study designs, including observational and experimental study design.	 Lecturing Interactive learning Use of the internet and the library 	AssignmentsPractical exam

Code	Course Learning Outcomes		Teaching		Assessment
Coue			Strategies		Methods
2.5	Construct contingency tables for study designs and analyze data from contingency tables.	• • •	Lecturing Interactive learning Use of statistical software Use of the internet and the library	•	Assignments Practical exam
2.6	Use a standard statistical software, such as Excel or SPSS, to implement the statistical methods in this course.	•	Lecturing Interactive learning Use of statistical software Use of the internet and the library	•	Assignments Practical exam
2.7	Analyse health data using statistical software and interrogate the test assumptions and interpret the results of computer-generated statistical analyses.	• • •	Lecturing Interactive learning Use of statistical software Use of the internet and the library	•	Assignments Practical exam
2.8	Read, analyze and interpret the result of scientific research	•	Lecturing Interactive learning Use of the internet and the library	•	Assignments Practical exam
3.0	Values			L	
3.1	Develop self-learning	•	Interactive learning Group interaction Problem solving	•	Assignments Midterm and final exams Practical exam
3.3	Reconstruct proposed solution to any problem based on the acquired knowledge and skills.	•	Interactive learning Group interaction Problem solving	•	Assignments Midterm and final exams Practical exam
3.4	Demonstrate the critical thinking in class discussion.	•	Interactive learning	•	Assignments

Code	Course Learning Outcomes	Teaching Strategies			Assessment Methods
		•	Group interaction Problem solving	•	Midterm and final exams Practical exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment-1 (Analyse health data using statistical	5	15%
1	software and interpret the result)		
2	Midterm Exam (MCQ)	8	20%
2	Assignment-2 (Analyse and interpret the result of scientific	10-11	15%
5	research)		
4	Final Exam (MCQ)	15	50%
5	Total		100%

*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:

- 2hrs. Academic office Hours
- Academic advising

F. Learning Resources and Facilities

1.Learning Resources

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	Goodman, M. S. (2017). Biostatistics for chinical and public health research.
Description of Transferration	Koutledge.
Required Textbooks	
	Celentano, D. D., Mhs, S., & Szklo, M. (2019). Gordis. Epidemiología.
	Elsevier.
	Rosner, B. (2015). Fundamentals of biostatistics. 2000. Brook/Cole-Cengage
	Learning, Boston, MA, USA.
Essential References	
Materials	Bruce, N., Pope, D., & Stanistreet, D. (2017). Quantitative methods for health
	research. Wiley and Sons.
	https://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH717-QuantCore/PH717-
Flootronio Motorials	Module3-Frequency-Association/PH717-Module3-Frequency-
Electronic water lais	Association4.html
Other Learning	
Matariala	
Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	 Effective classroom environment including the seats, desks, lights, and air conditioner, and cleanliness Projector Board
Technology Resources (AV, data show, Smart Board, software, etc.)	Laptop and projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• Computers lab with internet and audiovisual materials

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods	
Student Evaluation Course Survey.	Students	Checklist format	
 Content of the course Effectiveness of teaching and assessment methods. Media used during the course Teacher performance Environmental learning 	Students / Faculty / H e a d o f t h e Department	 Confidential completion of standard course evaluation questionnaire. Focus group discussion with small groups of students. Students opinions toward strengths, weakness and their suggestions for improvement. Students' exam/ assignment results. Faculty/ self - evaluation 	

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	