



Jordan University of Science and Technology
Faculty of Engineering
Biomedical Engineering Department

BME 301 Statistics for Biomedical Engineers

2013 Course Catalog

3 Credit hours (3 h lectures). Basic concepts of probability; Random variables ; discrete and continuous, probability mass & density functions, cumulative distribution function; Functions of random variables; Descriptive Statistics, histogram, Inferential statistics: hypothesis testing, significance levels, t-test; Linear regression.

Textbooks

Jay L. Devore. (2008). Probability and Statistics for Engineering and the Sciences. 8th Edition. Richard Stratton.

References

Books

- 1) W. Dainel. (1999). Biostastics. 7th ed., John Wiley & Sons, INC.N.Y
- 2) D.C. Montgomery. and G.C. Runger. (2003). Applied statistics and Probability for Engineers. Second edition. John Wiley & Sons Inc.

Journals

- 1) Applied Mathematics and Computation

Software

- SPSS
- R
- Minitab

Instructor

Instructor **Eng. Razan Shatnawi**, E-mail: razan.shatnawi@outlook.com

Prerequisites

Prerequisites by topic	Intermediate Analysis
Prerequisites by course	MATH 201
Co-requisites by course	MATH 201
Prerequisite for	(BME 564) Bioinformatics, (BME 580) Medical Informatics and Clinical Engineering, (BME 581) Healthcare Management Systems

Topics Covered

Week	Topics	Chepters in Text
1	Overview and descriptive statistics	Chapter 1
1-2	Probability	Chapter 2
2-3	Discrete random variables and probability distributions	Chapter 3
3-5	Continuous random variables and probability distributions	Chapter 4
5-8	Joint probability distributions and random samples	Chapter 5
9-10	Statistical Intervals based on a single sample	Chapter 7
11-13	Tests of hypothesis based on a single sample	Chapter 8
13-14	Inferences based on two samples	Chapter 9
14-15	The simple linear regression and correlation	Chapter 12

Evaluation

Assessment Tool	Expected Due Date	Weight
Quizzes and Performance	In Class	10%
First Exam	According to the department schedule	25 %
Second Exam	According to the department schedule	25 %
Final Exam	According to the University final examination schedule	40 %

Objectives and Outcomes¹

Objectives	Outcomes
Appreciate the role of Biostatistics in biomedical engineering (1, 3, 4, 6, 9)	Recognize purpose of using statistics: to control and make decisions.
Acquaint basic biostatistics concepts essential to the understanding of biomedical engineering and to provide exposure to a wide range of biomedical engineering technology in hospitals. (1, 3, 4, 6, 9)	Define the factors affecting biostatistics assessments. Learn the basic terminology in biostatistics: sample, population, random variable, process,...etc.
To be able to represent data in different ways. (1, 6, 8)	Identify the basic roles for graphical and numerical presentations in descriptive statistics. Recognize the role of self- teaching.
To develop a practical understanding of probability and its relationships. (1, 2, 6)	Understand the basic concepts of probability theory given the statistical data and events relationships to show how to investigate concepts of inferential statistics.
To be able to use statistics in clinical engineering (1, 3, 4)	Given the design specification students are capable to plan the entire management process using biostatistics.
To understand the concepts of discrete and continuous random variables. (1)	Investigate the role of random variables in probability distributions.
To develop skills of using discrete random variables to analyze probability problems. (1)	The role and usage of discrete probability distribution and its role in equipment maintenance. Recognize and use the different types of discrete random variable distribution functions (Binomial).
To develop skills of using continuous random variables to analyze probability problems. (1)	The role and usage of normal probability distribution and its role in equipment maintenance and error theory. Understand probability distributions
To understand the concepts of t-test (1, 2, 4, 6)	Use the sample to draw conclusions about the population
To be able to assess a situation involving data analysis, stating the nature of the question and the null and alternative hypotheses proposed (1, 2, 4, 6)	State hypothesis about the population. Decision based on the data analysis involving hypothesis testing.
To understand the concepts and ideas about linear regression. (1)	Learn the linear regression model parameters Estimating the model parameters

Contribution of Course to Meeting the Professional Component

The course contributes to building the fundamental basic concepts, applications, and design of statistics in Biomedical Engineering.

Relationship to Program Outcomes (%)

1	2	3	4	5	6	7	8	9
28	8	6	18		16	6	12	6

Relationship to Biomedical Engineering Program Objectives

PEO1	PEO2	PEO3	PEO 4
√	√	√	√

Prepared by:
Last Modified:

Eng. Razan Shatnawi
Sep 22, 2018