MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering

Course Syllabus Study Plan 2021

Course Code	Course Name	Credits	Contact Hours
0401109	Probability, Stochastic Processes & Statistics	3	3 T

INSTRUCTOR/COORDINATOR

Name	Dr. Omar Al-Ayasrah
Email/Office	o_alayasrah@mutah.edu.jo / Eng. Bldg.-Vice Dean Office
Office Hours	13:00-14:00 (Sun, Tues)
Classroom/Time	12:00 – 13:00 (Sun., Tues., Thurs.)

TEXTBOOK

Title	Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers
Author/Year/Edition	Roy D. Yates, David J. Goodman ./ John Wiley & Sons, Inc./2005/ Second Edition
Other Supplemental Materials	
Title	Probability and Statistics: The science of Uncertainty
Author/Year/Edition	Michael J. Evans and Jeffrey S. Rosenthal/2010/Second Edition

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

This course provides an elementary introduction to probability and statistics with applications.

Set theory and introduction to probability. Random variables and probability. Discrete and continuous one random variable. Pairs of random variables: discrete and continuous for all probability models. Their tests and statistics for random variables. Discrete and continuous random processes: stationary processes, Gaussian process, Poisson process power spectral density, cross correlations, auto-correlation response for random signals.

Elements of statistics: Sampling theory, sampling variance, sampling distributions, hypothesis testing, curve fitting and linear regression.

Random Process, Correlation Functions, Spectral Density.

B. Pre-requisites (P) or Co-requisites (C)

Calculus (2) (0301102) **(P)**

C. Course Type (Required or Elective)
Required

SPECIFIC GOALS

A. Course Learning Objectives (CLOs)

By the end of this course, the student should be able to:

<u>**CLO1:**</u> Understand the basics of probability and apply it to solve different experiments [1]**.**

<u>**CLO2:**</u> Understand and apply the mathematical descriptions of different random variables. Including (PMF), (CDF), (PDF), apply these concepts to engineering problems [1].

<u>**CLO3:**</u> Be able to calculate the various moments of random variables such as mean values, variances and standard deviations (and higher order moments) [1]

<u>**CLO4:**</u> Use statistical concepts to analyze and interpret engineering data [1].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
✓						

BRIEF LIST OF TOPICS TO BE COVERED		
List of Topics	**No. of Weeks**	**Contact Hours**
Experiments, Models, and Probabilities: Applying Set Theory to Probability, Conditional Probability, Counting Methods, Independent Trials, Reliability Problems.	2	6
Discrete Random Variables : Probability Mass Function ,Families of Discrete Random Variables, Cumulative Distribution Function (CDF) Functions of a Random Variable ,Expected Value of a Derived Random Variable ,Variance and Standard Deviation ,Conditional Probability Mass Function.	3	9
Continuous Random Variables : Probability Density Function, Gaussian Random Variables, Delta Functions, Families of Continuous Random Variables, Conditioning a Continuous Random Variable .	2	6
Pairs of Random Variables :Joint PMF ,Joint PDF ,Joint CDF, Marginal PMF ,Marginal PDF, Max Functions ,Sums of two Random Variables, Independent Random Variables .Correlation Coefficient .	3	9
Central Limit Theorem Applications, Introduction to Stochastic Processes	1	3
Basic Statistics: descriptive measures of engineering data, sampling distributions, estimation of mean and variance,	3	9

confidence intervals, hypothesis testing, curve-fitting and regression, parameter estimation, maximum likelihood estimation.		
Total	*14*	*42*

EVALUATION

Assessment Tool	Due Date	Weight (%)
Mid Exam	According to the university calendar	30
Course Work (Home-works, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
	Relationship to program outcomes	
ABET 1-7		**… Engineering Student Outcomes**
1	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic
3		ability to communicate effectively with a range of audiences
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives..
6		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies