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: **CLO1:** Understand the basics of probability and apply it to solve different experiments [1]. **CLO2:** Understand and apply the mathematical descriptions of different random variables. Including (PMF), (CDF), (PDF), apply these concepts to engineering problems [1]. **CLO3:** Be able to calculate the various moments of random variables such as mean values, variances and standard deviations (and higher order moments) [1] **CLO4:** 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