



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Centre

Course Syllabus

Course Name: Probability Theory

Course Syllabus

1	Course title	Probability Theory
2	Course number	(0301333)
3	Credit hours	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	0301201
5	Program title	B.Sc.
6	Program code	
7	Awarding institution	The University of Jordan
8	School	Science
9	Department	Mathematics
10	Course level	College requirement
11	Year of study and semester (s)	all Semesters
12	Other department (s) involved in teaching the course	none
13	Main teaching language	English
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
16	Issuing/Revision Date	October 31, 2022

17 Course Coordinator:

Name: Prof. Amal Helu

Contact hours:

Office number:370

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**18 Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

Distributions of random variables; conditional probability and stochastic independence; some special distributions (discrete and continuous distributions); univariate, bivariate and multivariate distributions; distributions of functions of random variables (distribution function method, moment generating function method, and the Jacobian transformation method); limiting distributions.

20 Course aims and outcomes:

A- Aims:

1. Identify the stochastic experiments and choose the proper model.
2. Handle different probability distributions: p.d.f., c.d.f., moments.
3. Find the distributions of functions of random variables.
4. Find limiting distributions (central limit theorem and convergence of random variables).

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to Successful completion of the course should lead to the following outcomes:

A. Knowledge and Understanding Skills: Student is expected to A1. Define a probability set function and be able to:

- (a) Verify whether a given set function is a probability set function or not.
- (b) Find the values of summations or integrals related to some probability set function.
- (c) Prove some important properties of probability set functions.

A2. Define the random variable and its probability distribution and characterize the distribution by the probability density function and the distribution functions.

A3. Know the definitions and the properties of some special distributions like:

- (a) Discrete Distributions: Binomial and multinomial, Poisson, geometric, and negative binomial.
- (b) Continuous. Normal, gamma, chi-square, t-dist'n, F-distribution, and Beta-distribution.

A4. Know the different types of convergence of random variables (convergence almost surely, convergence in probability and convergence in distribution) and the relations between these types of convergence.

A5. Know the central limit theorem (statement and proof) and know when and how to use it to approximate the distribution of some functions of random variables.

B. Intellectual Analytical and Cognitive Skills: Student is expected to

B1. Understand the concept of "laws of large number" and prove the strong and the weak laws of large numbers.

C. Subject- Specific Skills: Student is expected to

C1. Construct the probability model for random experiments.

C2. Use the properties of distributions to find moments and probability distribution of functions of random variables.

D. Creativity /Transferable Key Skills/Evaluation: Student is expected to

D1. Find some mathematical terms related to random variable like, the kth moment, the mean and the variance, and the moment generating function and how to use it to find the moments of a given random variable.

21. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods
Probability set functions.	1		A1	Exam
Random variables.	2-3		A2, D1	Exam
Special distributions.	4-6		A3, C1, D1	Exam
Joint distributions.	7 - 8		A2, D1	Exam
Properties of random variables.	9-10		D1	Exam
Distributions of functions of random variables.	11-12		C2	Exam
Limiting distributions.	13-15		A4, A5, B1	Exam

22 Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

ILO/s	Learning Methods	Evaluation Methods	Related ILO/s to the program
	Lectures	Exam	A1, A2,A3,B1,D2

23 Course Requirements

Data Shows

24 Course Policies:

Attendance is essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled times. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.

If a student is absent for more than 10% of the lectures without an excuse (of sickness or due to other



insurmountable difficulty), then the student shall be barred from sitting for the final examination. Also he/she will get a failing grade in this course.

Medical certificates for excuses of exam absences should be introduced to the University Physician for authorization. These authorized certificates should also be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.

Test papers shall be returned to students after correction, where the student mark is considered final after a lapse of one week following their return.

Cheating is prohibited, where University cheating regulations will be applied on any student who cheats in exams or on home works.

25 References:

A- Required book (s), assigned reading and audio-visuals: Bain, L. J. and Engelhard, Introduction to Probability and Mathematical Statistics.

B- Recommended books, materials, and media: Hog, R. V. and Craig, A. T., Introduction to Mathematical Statistics, 5th edition, Prentice-Hall 1995.

26 Additional information:

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Name of Course Coordinator: Prof. Amal Helu	Signature: A. Helu	Date: October 31, 2022
Head of Curriculum Committee/Department: Prof. Ahmad Al Zghoul-- Signature: -----		
Head of Department: -Prof. Manal Ghanem - Signature: -M. Ghanem		
Head of Curriculum Committee/Faculty: ----- Signature: ----		
Dean: Mahmoud Jaghoub Signature: -----		