جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Mathematical Statistics

Course Number: 0101442

General Course Information:

Course Title	**Mathematical Statistics**
Course Number	0101442
Credit Hours	3 credit hours
Education Type	Traditional learning
Prerequisites/Co-requisites	Probability Theory (0101341)
Academic Program	Mathematics
Program Code	0101
Faculty	Faculty of Information Technology
Department	Mathematics
Level of Course	4
Academic Year /Semester	2023/2024 2st Semester
Awarded Qualification	BS'c
Other Department(s) Involved in Teaching the Course	-
Language of Instruction	English
Date of Production	2021-2022
Date of Revision	

Course Coordinator:

Coordinator's Name	Dr. Ma'mon Abu Hammad
Office No.	9319
Office Phone Extension Number	
Office Hours	11-12:30 Sunday- Tuesday. 9:30-11 Monday- Wednesday.
E-mail	m.abuhammad@zuj.edu.jo

Other Instructors:

Instructor Name	NA
Office No.	
Office Phone Extension Number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	*This course discusses Sampling distribution, Estimation theory, Point estimation. Unbiased estimators, Consistency, Efficiency. Sufficiency, Method of Moments, Method of Maximum likelihood. Interval estimation and Hypothesis testing about the parameters.*
Arabic	يتناول هذا المساق توزيع العينات، نظرية التقدير، تقدير النقاط. المقدرون غير المتحيزون، الاتساق، الكفاءة. الكفاية، طريقة اللحظات، طريقة الاحتمالية القصوى. تقدير الفترات واختبار الفرضيات حول المعلمات.

Textbook: *Author(s), Title, Publisher, Edition, Year, Book website.*

Bain,Lee, J. and Engelhardt, Introduction to Probability and Mathematical Statistics, 2nd edition. Max. Publisher Duxbury Press 1987.

References: *Author(s), Title, Publisher, Edition, Year, Book website.*

1. Dennis Wackerly, William Mendenhall and Richard Scheaffer, Mathematical Statistics with applications , Publisher Thomson Brooks /Cole 2008. , 7th edition.
2. Devore, Jay,L. and Berk, Kenneth,N. ,Modern Mathematical Statistics with Applications. Publisher Thomson Brooks/Cole 2007.
3. Miller & Miller, Mathematical Statistics with applications, By Pearson Prentice Hall, seventh edition, (2004).
4. Hogg, Robert, V. and Craig,Allan,T., Introduction to Mathematical Statistics, Publisher: Prentice-Hall 5th edition, 1995.

Course Educational Objectives (CEOs):

CEO1	Gain proficiency in working with common probability distributions such as the normal, binomial, Poisson, gamma, beta, and uniform distributions.
CEO2	Learn about various sampling methods and how to design and conduct unbiased, sufficient, efficient and unique maximum unbiased estimator surveys and experiments.
CEO3	Become proficient in conducting hypothesis tests, understanding p-values, and making informed decisions based on statistical evidence.

Intended Learning Outcomes (ILO's):

Intended learning outcomes (ILOs)		Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	JNQF Descriptors**
K	Knowledge and Understanding				
ILO1-k	Setting up the probability of distributions.	1	PLO3-k	Remembering	K
ILO2-k	Select the best point estimate.	2	PLO2-k	Analyzing	K
S	Intellectual skills				
ILO3-s	Classify the estimate of parameters according to properties.	2	PLO8-s	Applying	S
ILO4-s	Estimate the sample size.	3	PLO8-s	Applying	S
ILO5-s	Explain a decision about the hypothesis.	3	PLO6-s	Analyzing	S
C	Subject specific skills				
ILO6-c	Finding the relation between the theory of probability and applied statistics.	1	PLO12-c	Applying	C
ILO7-c	Develop the individual's ability to communicate and interact with other mathematical courses.	3	PLO12-c	Analyzing	C

D	Transferable skills:					
ILO6-d						
*Bloom Taxonomy Levels:						
Level #	1	2	3	4	5	6
Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
** Descriptor (National Qualification Framework Descriptors): K: Knowledge, S: Skill, C: Competency.						

Program Learning Outcome (PLOs):

(PLOs)		JNQF Descriptors**		
		K	S	C
1.	Knowledge of the main concepts in pure mathematics.	√		
2.	Knowledge of the main concepts in applied mathematics.	√		
3.	Explain concepts, principles and theories in the fields of probability and statistics.	√		
4.	Possession of technological culture related to the fields of mathematics and its applications.	√		
5.	Making use of mathematical logic in practical life.		√	
6.	Engaging scientific methodology as a way of thinking and as a tool in facing problems.		√	
7.	Applying mathematical software packages in problem solving.		√	
8.	Being capable of data analysis.		√	
9.	Capability of teaching according to modern educational techniques.		√	
10.	Develop creative and innovative methods of teaching mathematics.		√	
11.	Showing the ability to work under ethical and professional standards within teams.			√
12.	Gaining critical thinking and scientific research skills.			√

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Weekly Schedule *(please choose the type of teaching)*

- ☒ **Face to Face (F2F)**
- ☐ **Hybrid** *(One – To - One)*
- ☐ **Online**

Schedule of Simultaneous and their Topics:

Week	First Lecture (F2F)	Second Lecture (F2F)	ILOs	PLOs	JNQF Descriptors*
1	Brief Review of probability distributions of	Brief Review of probability distributions of	ILO1-k	PLO3-k + PLO2-k	k

	discrete	continuous random variables.			
2	Random samples	Random sampling distributions, statistics.	ILO1-k	PLO3-k + PLO2-k	k
3	Sampling distributions of the sample mean	Sampling distributions of the variance.	ILO1-k	PLO3-k + PLO2-k	k
4	Point estimation. Unbiased estimators.	Consistency, Efficiency, estimators.	ILO2-k	PLO3-k + PLO2-k	k
5	Sufficiey, Compless	Method of Maum likelihd.	ILO2-k	PLO3-k PLO2-k	k
6	Interval estimation. The estimation of means.	Interval estimation. The estimation of means.	ILO3-s ILO4-s	PLO6-s PLO8-s	s
7	Estimation of difference between means, Estimation of proportions.	Estimation of difference between means, Estimation of proportions.	ILO5-s	PLO6-s	s
Midterm Exam (30%)					
9	Estimation of difference between proportions.	Estimation of variances and ratio of two variances	ILO5-s	PLO6-s	**s**
10	Solving various problems depending of the estimations. Hypothesis testing. z- Test of the mean.	Solving various problems depending of the estimations. Hypothesis testing. z- Test of the mean.	ILO3-s ILO4-s	PLO6-s PLO8-s	s
11	t- Test of the mean, traditional method. P-value method.	t- Test of the mean, traditional method. P-value method.	ILO5-s	PLO6-s	**s**
12	Tests concerning difference between means.	Tests concerning difference between means.	ILO5-s	PLO6-s	**s**
13	Tests concerning proportions.	Tests concerning proportions.	ILO5-s	PLO6-s	**s**
14	Tests concerning variances.	Tests concerning variances.	ILO6-c ILO7-c	PLO12-c	c
15	Solving various problems depending of hypothesis testing.	Solving various problems depending of hypothesis testing.	ILO6-c ILO7-c	PLO12-c	c
16	**Final Exam**				

* **K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Lecture.

Course Policies:

A- Attendance policies:
The maximum allowed absences is 15% of the lectures.
B- Absences from exams and handing in assignments on time:
Midterm exam can be retaken based on approval of excuse by the instructor's discretion.
Not handing assignment on time will incur penalties.
C- Academic Health and safety procedures
D- Honesty policy regarding cheating, plagiarism, and misbehaviour:
Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.
E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) 3**0%**
- Midterm 30**%**
- Final Exam **40 %**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required Equipment:

- Classroom
- E-learning plan

Assessment Tools Implemented in the Course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework

Responsible Persons and their Signatures:

Course Coordinator		**Completed Date**	/ /
		Signature	
Received by (Department Head)		**Received Date**	/ /
		Signature	