



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name: Mathematical Statistics

Course Syllabus

1	Course title	Mathematical Statistics
2	Course number	(0331431)
3	Credit hours	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	(0301333)
5	Program title	B.Sc. Mathematics
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)	3 rd or 4 th year, 1 st and 2 nd or summer semester
12	Other department (s) involved in teaching the course	None
13	Main teaching language	English
14	Delivery method	Face to Face
15	Online platforms(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
16	Issuing/Revision Date	7 th Nov, 2022

17 Course Coordinator:

Name: Prof. Morad Ahmad

Contact hours: 10:00 – 11:30 (Mon, Wed)

Office number: 317

Phone number: 22089

Email: morad.ahmad@ju.edu.jo

**18- Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

As stated in the approved study plan.

Estimation: point estimation, confidence interval; statistical test: Neyman-Pearson Theorem, UMP test; likelihood ratio tests, chi-square tests, SPRT; non -parametric methods; Sufficient statistics and its properties; complete statistics exponential family; Fisher Information and the Rao-Cramer inequality.

20 Course aims and outcomes:

- A- Aims:
 B- Find different types of estimators like the MLE, MMC, and Bayes estimators.
 C- Find a complete and sufficient statistic for a parameter or some function of a parameter.
 D- Construct UMVUE for a certain parameter.
 E- Carry out a statistical test and know the different types of tests, like the most powerful test, the likelihood ratio test, and the chi-square tests.

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)	SLO (7)	SLO (8)
1. Understand the main idea of estimation theory (interval and point estimate).	•							
2. Know the concepts of sufficiency and completeness. And how to check these properties for a given estimator.		•						
3. Understand the concept of testing hypotheses problem, and know the types of errors that can be committed in such problems, besides concept of the power function of a statistical test.			•					
4. Verify if a given estimator is unbiased, consistent, and efficient or not.	•		•					
5. Compute some types of estimators for a parameter (or parameters) like: (a) The maximum likelihood estimators. (b) The method of moment estimators. (c) The Bayes estimators.	•	•						
6. Construct a confidence intervals using the pivotal quantity method and the general method.	•	•	•					
7. Use sufficiency and completeness concepts to construct the uniformly Minimum Variance Unbiased Estimator for an unknown parameter and for a function of the unknown parameter.	•	•						
8. Carry out the following tests:) The most powerful level α test.) The likelihood ratio test.) Goodness of fit test.) Some non-parametric tests.	•	•	•					

21 . Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
I. Estimation 1- Point estimation 2- MLE and MME 3- Bayesian estimators 4- Measures of quality of estimators 5- Cramer-Rao inequality 6- Sufficient statistics and properties) 7- Completeness and uniqueness 8- The exponential families 9- Confidence intervals	1-6				
II. Testing statistical Hypotheses 1- Definitions and terminology 2- Certain best tests 3- Uniformly most powerful tests 4- Likelihood ratio test 5- Sequential probability ratio test 6- Chi-square tests	7-15				

22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Quiz #1	10		1, 2		On Campus
Quiz #2	10		1, 2		On Campus
Report	10		1, 2		On Campus
Midterm	30		1,2, 3		On Campus
Final Exam	40		1, 2, 3		On Campus



23 Course Requirements

Each student must have:

- Account on Microsoft Teams

24 Course Policies:

1. Attendance is absolutely 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 time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
2. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
3. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
4. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
5. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to 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 Engelhardt, M. Introduction to Probability and Mathematical Statistics. B- Recommended books, materials, and media:

Hogg, R.V. and Craig, A.T., Introduction to Math. Statistics, Fifth Edition, Printice-Hall 1995.

26 Additional information:

Name of Course Coordinator: Prof. Emad Abuosba Signature: ----- Date: 10-10-2022
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: -----