1	**Course title**	Mathematical Statistics
2	**Course number**	0301731
3	**Credit hours**	3
	Contact hours (theory, practical)	3
4	**Prerequisites/corequisites**	None
5	**Program title**	Master of Mathematics
6	**Program code**	
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Mathematics
10	**Level of course**	Graduate Level
11	**Year of study and semester (s)**	Second or third semester
12	**Final Qualification**	Masters Degree
13	**Other department (s) involved in teaching the course**	None
14	**Language of Instruction**	English
15	**Date of production/revision**	

16. Course Coordinator:

Name: Ahmad Alzghoul
Office number: 304
Email: a.zghoul@ju.edu.jo

17. Other instructors:

Name: Mohammad Raqab
Office number:
Phone number:
Email: m.raqab@ju.edu.jo

18. Course Description:

Univariate and multivariate distribution theory, sufficient statistics, minimal sufficient statistics, completeness, methods of point estimation and properties of point estimators, confidence, intervals, testing hypotheses, Neman-Pearson lemma, randomized tests, uniformly most powerful test, likelihood ratio tests, minimax methods.

19. Course aims and outcomes:

A- Aims:

This course aims at:
1. Providing students with widely used statistical models.
2. Enable students to construct and assess estimators and hypotheses tests.

B- Intended Learning Outcomes (ILOs):
Upon successful completion of this course, students will be able to:
1. acquire good knowledge of main statistical distributions and their properties,
2. understand the basic principles underlying estimation properties including data reduction, sufficiency and completeness and related theory,
3. be able to construct estimators using different methods including MME, MLE, and to derive their properties,
4. gain knowledge of Bayesian estimation and to recognize difference between frequency and Bayesian approaches,
5. understand the basic principles underlying hypothesis testing including most powerful tests, Neyman-Pearson Lemma, likelihood ratio test and related theory,
6. understand large sample theory and be able to apply it to estimators and tests.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Review of probability concepts and some statistical models	1-2		1		
Families of distributions; Exponential, location, scale, and location-scale families.	3		1+2		
Sufficiency and Completeness; sufficient and minimal sufficient statistic, ancillary statistic, completeness, Basu theorem.	4-5		2		
Estimation; Methods of point estimation; Methods of moments, least squares method, maximum likelihood method, properties of point estimators; unbiasedness, efficiency, and consistency, variance bounds and information.	6-9		3+6		
Decision theory; Loss and risk functions, minimax estimator, Bayes estimator.	10		4		
Confidence intervals; Bayes C.I., pivotal method, large sample C. I.	11		3+6		
Testing; Uniformly most powerful tests, Neman-Pearson lemma, unbiased tests, monotone likelihood test, likelihood ratio test.	12-15		5+6		

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21. Teaching Methods and Assignments:

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

In order to succeed in this course, each student needs to be an active participant in learning – both in class and out of class.

- Lectures and discussion through the class time
- Encourage the team work by discussion of some real life data
- Various sets of homework will be assigned on different period of times.
- The solutions of the homework sets and the exams will be solved in the class to allow students to learn and figure out their mistakes.

22. Evaluation Methods and Course Requirements:

ILO/s	Learning Methods	Evaluation Methods	Related ILO/s to the program
	Lectures	Exams	
	Home works	Assignments	
	Discussions		

23. 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. Solutions for the exams questions and marks will be announced to the students.
6. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on home-works

24. Required equipment: (Facilities, Tools, Labs, Training….)

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25. References:

1. Statistical Inference, 2002, Casella and Berger, Duxbury,E.L.
2. Mathematical Statistics, 1998, Lehman, G. Casella, Springer.
3. Mathematical Statistics: Basic Ideas and Selected Topics, Vol1 and Vol2, 1977, Bickel and Doksum, Prentice-Hall.

26. Additional information:

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Name of Course Coordinator: Dr. Ahmad Alzghoul   Signature: ----------------- Date: ----------

Head of curiculum committee/Department: Dr. M. Al-Raqab   Signature: --------------------------------

Head of Department: M. Al-Raqab   Signature: -------------------------------

Head of curiculum committee/Faculty: Dr. Ahmad Al-Zghoul   Signature: -------------------------

Dean: ---   Signature: -------------------------------