The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name: Mathematical Statistic

1	Course title	Mathematical Statistic
2	Course number	0301931
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	None
5	Program title	Ph.D. Mathematics
6	Program code	
7	Awarding institution	Department of Mathematics, University of Jordan
8	Faculty	Science
9	Department	Mathematics
10	Level of course	Ph.D.
11	Year of study and semester (s)	First year, first or second semester
12	Final Qualification	Ph.D. In Mathematics
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	2016/2017

16. Course Coordinator:

Office number 304; office hours: 1-2 sun, Tus,
*   12:30-1:30 Monday,*
Azzamm@ju.edu.jo

17. Other instructors:

Office number 306; office hours: 12-1 sun,
*   10-11 Tus,*
*   12:30-1:30 Mon,*
Awada@ju.edu.jo

18. Course Description:

Theory of point estimation: unbiasedness, equivariance, resampling, Bootstrap and Jackknife estimates, large sample theory, asymptotic optimality. Theory of testing statistical hypotheses, the decision problem, uniformly most powerful tests, unbiasedness. Invariance, minimax principles.

19. Course aims and outcomes:

A- Aims: Understand basic concepts of estimation and testing statistical hypotheses. Derivation of basic theorems and properties. Carry out independent reading and suggest some research problems.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...

(1) Know the objectives of statistical inference.

(2) Explore different estimators for unknown parameters.

(3) Check the properties of estimators.

(4) Give estimators that satisfy certain specified properties. Construct confidence intervals.

(5) Know the components of a decision problem; and how to use them in constructing min-max and max-min estimators.

(6) Use software to simulate data (Bootstrap and Jackknife), and hence find estimators corresponding to the sampling scheme used.

(7) Know the terminology of testing hypotheses.

(8) Prove basic theorems related to testing hypotheses in the classical, Bayesian, and sequential procedures.

(9) Construct the uniformly most powerful tests.

(10) Read some research papers and write down a report about some of these papers and present it in class.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Point Estimation	2	M. Azzam	1, 2, 9	1) Exams,	1A, 2A, (2b) B
Confidence intervals	1	M. Azzam	4	2) Home-works	1A, 2A, (2b) B
Properties of estimator	2	M. Azzam	3		1A, 2A, (2a) B
Testing hypotheses	3	M. Azzam	4, 7, 8	3) Presentation and Report	1A, 2A, (2a) B
Decision theory	3	M. Azzam	5		1B
Presentation	2	M. Azzam	6, 10		Selected papers

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following <u>teaching and learning methods</u>:
In order to succeed in this course, each student needs to be an active participant in learning – both in class and out of class.
- Class time will be spent on lecture as well as discussion of homework problems and some group work.
- To actively participate in class, you need to prepare by reading the textbook and doing all assigned homework before class (homework will be assigned each class period, to be discussed the following period).
- You should be prepared to discuss your homework (including presenting your solutions to the class) at each class meeting - your class participation grade will be determined by your participation in this.
- You are encouraged to work together with other students and to ask questions and seek help from the professor, both in and out of class.

22. Evaluation Methods and Course Requirements:

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

ILO/s	Learning Methods	Evaluation Methods	Related ILO/s to the program
	Lectures	**Exam**	
		Presentation	
		Homework	

23. Course Policies:

1. The student is not allowed to take the course and its pre-requisite in the same time.
2. 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.
3. 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.
4. 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.
5. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
6. Solutions for the exams questions and marks will be announced at the webpage of the instructor: http://eacademic.ju.edu.jo/eabuosba/default.aspx
7. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homeworks.

24. Required equipment:

25. References:

A-   Required book: Gillman, L. and Jerison, M. (1976) Rings of Continuous Functions, Princeton: Van Nostrand

(1) Beaumont G.P. Intermediate Mathematical Statistics, Chapman and Hall, London (1980).

(2) Bickk, P.J. and Doksum, K.A., Mathematical Statistics; Basic Idens and selected Topics, Holden-Day (1977).

B-   Recommended books: Walker, R. (1974) The Stone-Cech Compactification, Springer-Verlag, Berlin.

(1) Ferguson, T.S., Mathematical statistics: Adecision Theoretical Approach, Academic press (1967).

(2) Lehman, E. L. (a) Testing statistical Hypotheses, Wily (1959)

　　　　　　　(b) Theory of point Estimation, Wiley (1985).

26. Additional information:

Name of Course Coordinator: Dr. Adnan Awad, Dr. Mufid Azzam Signature: ----------- Date: 19/2/2017

Head of curriculum committee/Department: ----------------------- Signature: --------------------------------

Head of Department: ------------------------ Signature: --------------------------------

Head of curriculum committee/Faculty: ------------------------ Signature: --------------------------------

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

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