1	**Course title**	Nonparametric
2	**Course number**	0301733
3	**Credit hours (theory, practical)**	3
	Contact hours (theory, practical)	3
4	**Prerequisites/corequisites**	None
5	**Program title**	Master degree
6	**Program code**	
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Mathematics
10	**Level of course**	elective
11	**Year of study and semester (s)**	First and second year
12	**Final Qualification**	Master degree
13	**Other department (s) involved in teaching the course**	None
14	**Language of Instruction**	English
15	**Date of production/revision**	

16. Course Coordinator:

Dr. Amal Helu
Department of Mathematics
Email: a.helu@ju.edu.jo

17. Other instructors:

18. Course Description:

This course provides theory and computing tools to perform nonparametric tests including the sign test, Wilcoxon signed rank test, and Wilcoxon rank sum test, as well as the corresponding nonparametric point and interval estimation. Kruskal-Wallis and Friedman tests for one-way and two-way analysis of variance, multiple comparisons, dispersion and independence problems are other nonparametric tests covered. Other topics include estimation methods for nonparametric density estimation.

19. Course aims and outcomes:

A- Aims:

Nonparametric statistical methods combine the theory and application of commonly used distribution-free test statistics, density and function estimation methods. Analysis of data from problems in many fields such as agricultural science, biology, education, engineering environmental science, medicine, physics, and psychology are some important examples.

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

1. Summarize data using both graphical and numerical methods for use in nonparametric statistical methods.
2. Formulate, test and interpret various hypothesis tests for location, scale, and independence problems.
3. Use statistical methods, including nonparametric bootstrapping, to construct and interpret interval estimators for population medians and other population parameters based on rank-based methods.
4. Characterize, compare, and contrast deferent nonparametric hypothesis tests.
5. Produce and interpret statistics and graphs, using nonparametric density estimation and non-parametric function estimation techniques.
6. Present and communicate, both orally and in written-form, the results of statistical analyses of nonparametric data.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Dichotomous Data a. Binomial Tests b. Point Estimation and confidence Intervals	1-3		1+2		
One-Sample Location Problems a. Sign Rank Test b. Sign Test b. Point Estimation and Confidence Intervals	4-5		1+2+3+4		
Two-Sample Location Problems a. Rank Sum Test b. Point Estimation and Confidence Intervals	6-7		1+2+3+4		

One-Way Layout and Two-Way Layout a. Kruskal-Wallis and Friedman tests b. Multiple Comparisons	8-9		2+3+4		
Independence Problems a. Efron's Bootstrap	10-11		5+6		
Regression and Density and Density Estimation a. Estimation Problems b. Smoothers and Kernels	12-15		5+6		

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 working on projects and on analysing real applications
- 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	Project
	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:

Hollander, M., Wolfe, D. A., and Chicken, E. (2014). Nonparametric Statistical Methods, 3rd Edition. John Wiley & Sons, Inc.

26. Additional information:

Name of Course Coordinator: Dr. Amal Helu Signature: ---------- Date: ----------

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

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

Head of curriculum committee/Faculty: Dr. A. Al-Zghoul Signature: ----------

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