

Detailed Course Description - Course Plan Development and Updating Procedures/ Department	QF01/0408-3.0E
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Faculty	Science	Department	Mathematics
Course number	0101442	Course title	Mathematical Statistics
Number of credit hours	3	Pre-requisite/co-requisite	Probability Theory 0101341

Brief course description: Sampling distribution, Estimation theory, Hypothesis testing about the parameters.

Course goals and learning outcomes	
Goal 1	Derive fundamental results and theorems in probability theory and mathematical statistics.
Learning outcomes	1.1 Students will be able to use the probability distributions. 1.2 Students will be able to find the sampling distributions of the sample mean and sample variance.
Goal 2	Apply the theoretical tools of estimation theory.
Learning outcomes	2.1 Students will be able to find an estimator of the parameter. 2.2 Students will be able to find the point estimation of the parameter. 2.3 Students will be able to find an interval estimation of the parameter.
Goal 3	Hypothesis Testing about the parameters.
Learning outcomes	3.1 Students will be able to design a test of hypothesis about the parameter. 3.2 Students will be able to make a decision about the hypothesis. 3.3 Students will be able to summarize the results of the test.
Goal 4	Become well aware of the close link between probability as a foundation for solid statistical inference.
Learning outcomes	4.1 Students will be able to make a relation between a theory of probability and applied statistics.
Textbook	1.- Mathematical statistics with applications, seventh edition, by John E. Freund's (2004), Pearson Prentice Hall. 2.- Mathematical Statistics with applications, 7 th edition. By Dennis Wackerly, William Mendenhall and Richard Scheaffer, Publisher Thomson Brooks/Cole 2008.
Supplementary references	1.- Modern Mathematical Statistics with Applications. By Devore, Jay,L. and Berk,Kenneth,N. Publisher Thomson Brooks/Cole 2007. 2.- Introduction to Probability and Mathematical Statistics,2 nd edition . By Bain, Lee, J. and Engelhardt, Max. Publisher: Duxbury Press 1987. 3.- Introduction to Mathematical Statistics,5 th edition. By Hogg, Robert, V. and Craig,Allan,T. Publisher: Prentice-Hall 1995

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Course timeline				
Week	Number of hours	Course topics	Pages (textbook)	Notes
01	1 1 1	Brief Review of probability distributions of discrete and continuous random variables		
02	1 1 1	Random samples and sampling distributions, statistics.	266-273	
03	1 1 1	Sampling distributions of the sample mean and sample variance.	266-273	
04	1 1 1	Point estimation. Unbiased estimators, Consistency, Efficiency.	318-330	
05	1 1 1	Sufficiency, Method of Moments, Method of Maximum likelihood.	331-342	
06	1 1 1	Interval estimation. The estimation of means. First Exam 20%	354-358	
07	1 1 1	Estimation of difference between means, Estimation of proportions.	358-363	
08	1 1 1	Estimation of difference between proportions. Estimation of variances and ratio of two variances.	364-369	
09	1 1 1	Solving various problems depending of the estimations. Hypothesis testing. z-test of the mean.	375-376 403-406	
10	1 1 1	t-test of the mean, traditional method.	403-406	
11	1 1 1	P-value method.		
12	1 1 1	Tests concerning difference between means. Second Exam 20%	406-409	
13	1 1 1	Tests concerning proportions.	412-417	

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14	1 1 1	Tests concerning variances.	409-412	
15	1 1 1	Solving various problems depending of hypothesis testing.		
16	1 1 1	Final Exam (50%)		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	Practical (clinical) course evaluation methods	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%
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Approved by head of department		Date of approval	
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Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	d. Abdulkarim Farah	Office Number	127
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Office hours			