Course Specification
(Postgraduate)

Course Title:	**Theory of statistics(2)**
Course Code:	**202594-3**
Program:	**M.Sc. in Statistics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Taif University**
Version:	**2023**
Last Revision Date:	**7/4/1445**

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A. General information about the course:

1. Course Identification:

1. Credit hours: (…3……)				
2. Course type				
A.	☐University	☐College	☒ Department	☐Track
B.	☒ Required		☐Elective	
3. Level/year at which this course is offered: (First Year/ Second Level)				
4. Course general Description:				
This course contains some very important topics in statistics. These topics are: Estimation methods - Maximum Likelihood method - Method of Moments and least squares - Hypotheses Testing - Power of the tests - Most powerful test – Neymann-Pearson lemma - asymptotic tests - Unbiased test - Uniformly most powerful test. Monotone tests– Neymann -Pearson theorem - Power curves - Likelihood ratio tests. Asymptotic distribution of likelihood ratio statistics – Goodness of fit tests – Bayesian testing hypotheses.				
5. Pre-requirements for this course (if any)**:**				
6. Pre-requirements for this course (if any)**:**				
7. Course Main Objective(s):				
After careful study of this course, student should be able to do the following: 1. Determine the estimator of a parameter. 2. Determine the power of the tests, most powerful test. 3. Understand the Neymann-Pearson lemma, asymptotic tests, unbiased test, uniformly most powerful test. 4. Understand the likelihood ratio statistics, goodness of fit tests and Bayesian testing hypotheses				

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)……**	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Recognize Neymann-Pearson lemma, Asymptotic tests, Unbiased test, Uniformly most powerful test.**	**K1**	**Lectures, Group discussions**	**Quizzes Exams Assignments**
1.2	**Outline The likelihood ratio statistics, goodness of fit tests.**	**K1**	**Lectures, Group discussions**	**Quizzes Exams Assignments**
1.3	**Outline Bayesian testing hypotheses.**	**K2**	**Lectures, Group discussions**	**Quizzes Exams Assignments**
1.4	**Describe methods of determining the estimator of a parameter, the power of the tests and the most powerful**	**K3**	**Lectures, Group discussions**	**Quizzes Exams Assignments**

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	test.			
2.0	Skills			
2.1	Apply the studied methods to find the estimator of a parameter, the power of the tests and the most powerful test.	S2	Lectures, Group discussions	Quizzes Exams Assignments
2.2	Evaluate the estimator of a parameter, the power of the tests and the most powerful test.	S4	Lectures, Group discussions	Quizzes Exams Assignments
3.0	Values, autonomy, and responsibility			
3.1	Participate effectively within groups and independently.	V1	Projects	Through the oral presentation of the projects.
3.2	Express mathematical and statistical ideas orally and in writing	V4	Projects	Through the oral presentation of the projects.
...				

C. Course Content:

No	List of Topics	Contact Hours
1-3	Estimation methods, Maximum Likelihood method, Method of Moments and least squares.	9
4-6	Hypotheses Testing, Power of the tests, Most powerful test, Neymann-Pearson lemma.	9
7-9	Asymptotic tests , Unbiased test, Uniformly most powerful test, Monotone tests, Neymann -Pearson theorem, Power curves.	9
10-12	Likelihood ratio tests, Asymptotic distribution of likelihood ratio statistics.	9
13-15	Goodness of fit tests, Bayesian testing hypotheses.	9
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes + Homeworks+ oral presentation +written test+ group project	Continues	30%
2.	Final exam	16 th	70%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	**J. L. Devore and K. N. Berk, Modern Mathematical Statistics with Applications, 2012, 2nd Ed., Springer.**
Supportive References	**Robert Bartoszyński and Magdalena Niewiadomska Bugaj, Probability and Statistical Inference,(2007), 2nd Ed.**
Electronic Materials	
Other Learning Materials	**Blackboard system**

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students - Laboratories equipped with suitable numbers of computers**
Technology equipment (Projector, smart board, software)	**Data Show**
Other equipment (Depending on the nature of the specialty)	**Wi-Fi internet connections**

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	Indirect
Effectiveness of students assessment	**Students**	Indirect
Quality of learning resources	**Peer reviewer**	Direct
The extent to which CLOs have been achieved	**Peer reviewer**	Direct
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	**DEPARTMENT OF MATHEMATICS AND STATISTICS**
REFERENCE NO.	
DATE	**7/4/1445**