



Course Specification

— (Postgraduate)

Course Title:	Reliability
Course Code:	202663-3
Program:	M.Sc. in Statistics
Department:	Mathematics and Statistics
College:	Science
Institution:	Taif University
Version:	2023
Last Revision Date:	7/4/1445



Table of Contents

A. General information about the course:.....	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:	4
C. Course Content:	5
D. Students Assessment Activities:	5
E. Learning Resources and Facilities:.....	5
F. Assessment of Course Quality:	6
G. Specification Approval Data:.....	7



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: (NA)

4. Course general Description:

Coherent systems – Reliability of systems of independent components – Parametric families of distributions in reliability theory – Principle of ageing – Parametric families of life distributions with monotone failure rate – Classes of life distributions based on notations of ageing – Distributions with IFRA for stock models - Mean life of series of multivariate distributions for dependent components – The bivariate exponential distribution and stock model – Renewal theory

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. Understand the Coherent systems, hazard function of important distribution functions.
2. Determine Reliability of systems of independent components.
3. Determine the Parametric families of distributions in reliability theory.
4. Determine the Mean life of series of multivariate distributions for dependent components
5. Understand the Principle of ageing, Classes of life distributions based on notations of ageing, Mean life of series of multivariate distributions for dependent components, Renewal theory.

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • 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 the Coherent systems.	K1	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments
1.2	Outline Reliability of systems of independent components	K2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments
1.3	Outline Classes of life distributions based on notations of ageing	K2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments
1.4	Describe Principle of ageing, Parametric families of life distributions with monotone failure rate.	K3	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments
2.0 Skills				
2.1	Apply the studied methods to find the Reliability of systems of independent components	S2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments
2.2	Evaluate , Parametric families of	S4	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Exams Assignments



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	distributions in reliability theory			
...				
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	System Reliability as a Function of Component Reliability, Reliability of systems of independent components	9
4-6	Parametric families of distributions in reliability theory, Principle of ageing	9
7-9	Parametric families of life distributions with monotone failure rate, Classes of life distributions based on notations of ageing	9
10-12	Distributions with IFRA for stock models, Mean life of series of multivariate distributions for dependent components	9
13-15	The bivariate exponential distribution and stock model, Renewal theory	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	William Q. Meeker, Luis A. Escobar, Statistical methods for reliability data, JOHN WILEY & SONS, INC. (1998)
Supportive References	Marvin Rausand, Anne Barros and Arnljot Høyland, System Reliability Theory Models, Statistical Methods, and Applications Third Edition, John Wiley & Sons, Inc. (2021)
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

