2023
TP-153

Course Specification
(Bachelor)

Course Title:	Multivariate Analysis
Course Code:	STS 411
Program:	Applied Statistics & Data Management
Department:	Mathematics
College:	College of Science
Institution:	Majmaah University, Saudi Arabia
Version:	2023
Last Revision Date:	18/09/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3(2+2)					
2. Course type					
A.	☐University	☐College	☒Department	☐Track	Others
B.	☒Required		☐Elective		
3. Level/year at which this course is offered: Level 7/ 4th year					
4. Course general Description:					
Studying statistical decisions under uncertainty with or without data. Consider statistical inference (estimation and hypothesis testing) from the standpoint of statistical decision making.					
5. Pre-requirements for this course (if any)**:**					
Sampling and non-parametric methods STS 235 **Time series and forecasting STS 224**					
6. Co-requisites for this course (if any)**:**					
Nil					
7. Course Main Objective(s):					
Reviewing the available decisions and the state of nature of each decision that will be made by the decision-maker and make the necessary comparisons between them using an appropriate numerical criterion as the loss function					
Training the students to make Statistical decisions under uncertainty with or without data					
Consider some inference problems from the point of view of decision					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
	Traditional classroom	30	50%
	E-learning	15	25%
	Hybrid • Traditional classroom • E-learning	15	25%
	Distance learning	0	0

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)**	15
Total		60

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	Understand the elements of the decision problem under investigation.	K3	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
1.2	Use mathematics for making decisions	K3	Direct teaching: Inquiry-based instruction PowerPoints	Homework Quiz Midterms Final Exams E-

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	exam Oral Exam
...				
2.0	**Skills**			
2.1	Make the suitable type of decision and the analysis among various techniques in the field under uncertainty	S3	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
2.2				
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate capability of choosing the appropriate statistical methods for a particular application	V3	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
3.2	Formulate significant research questions, use appropriate statistical decision method, and analyze and interpret the results	V3	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
...				

C. Course Content

No	List of Topics	Contact Hours
1.	No data decision: Actions Space, State of nature space, loss function	6
2.	Pure Min Max and Bayes actions	6
3.	Mixed Min Max and Bayes actions	6
4.	Data decision problem (Decision Rule)	6
5.	Pure Min Max and Bayes Decision Rules	6
6.	Value of the data in pure Min Max and Bayes solutions	6
7.	Mixed Min Max and Bayes Decision Rules	6
8.	Estimation as a decision problem	6
9.	Bayes Estimation as a decision problem	6
10.	Testing hypothesis as a decision problem	6
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term Exam	Week 7-14	30
2.	E- exam	Week 10	5
3.	Homework	Weeks 2,4,6,8,11	5
4.	Quizzes	Weeks 1,3,5,7,9,12	15
5.	Discussion	Weeks 7,8,9	5
6.	Final exam	Weeks 16-17	40

*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	Applied Multivariate Statistical Analysis, Johnson, R.A., Wichern, D.W, Pearson Education, 2007.
Supportive References	Multivariate Statistical Methods: A Primer , Manly, B.F.J. , Chapman & Hall/CRC., (3rd edition)

	2005.
Electronic Materials	Google scholar SDL
Other Learning Materials	Applied Multivariate Data Analysis, Everitt , B.S., Dunn, G., Wiley, (2nd edition) 2010

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students .Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical & Statistical software packages like : 1 -R ،SPSS ،MATHEMATICA .2 -MATLAB .3 -MAPLE . SCIENTIFIC WORKPLACE
Other equipment (depending on the nature of the specialty)	Computer Lab

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Effectiveness of students assessment	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
The extent to which CLOs have been achieved		
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	

DATE	