



Course Specification

— (Bachelor)

Course Title: Linear Algebra 2

Course Code: MTHS 233

Program: Applied Statistics & Data Management

Department: Mathematics

College: :: College of Science

Institution: Majmaah University, Saudi Arabia

Version: 2023

Last Revision Date: 27/9/2023



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A. General information about the course:

1. Course Identification

1. Credit hours: (2(2+0))

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (.....)

4. Course general Description:

This course covers the extended concepts of linear Algebra, the topics to will be covered are: Triangular matrix- Caley-Hamilton theorem- Characteristic Polynomials-- Danvour analysisThe Jordan form- Function of a matrix- Properties of eA eigenvectors and eigenvalues, finitedimensional vector spaces, matrix representations of linear transformations, first-order linear equations with applications, Systems of linear ODE's with constant coefficients, Solution by eigenvalue eigenvectors

5. Pre-requirements for this course (if any):

MTHS 211

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

1. Studying Eigen value and Eigen vector.
2. Studying the topic of advance linear algebra.
3. study the model matrix, power matrix and diagonal matrix
4. Studying the solution of system of first order Odes with Eigen value

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	20	75
2	E-learning		
3	Hybrid		





No	Mode of Instruction	Contact Hours	Percentage
	<ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning	10	25%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	20
2.	Laboratory/Studio	10
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		30

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	K.2	Students should be able to understand the quantitative and qualitative approaches of this course	Direct teaching: Inquiry-based instruction Power Points and discussions Aimed teaching: Discovery and oral questions	<ul style="list-style-type: none"> Homework Quiz Midterms Final Exams E-exam Oral Exam
1.2				
...				
2.0	Skills			
2.1	S.4	The students will explain and interpret a general knowledge of advance	Direct teaching: Lectures Differentiation	<ul style="list-style-type: none"> Homework Quiz





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
		linear algebra according to industry needs	Aimed teaching: Discovery and oral questions Indirect teaching: Peer Learning	<ul style="list-style-type: none"> • Midterms • Final Exams
2.2	S.4	The students will be able to understand and analyses the real life applications in mathematical forms and develop critical thinking in students		
...				
3.0	Values, autonomy, and responsibility			
3.1	V.2	The students should be able to identify, formulate and solve system of first-order odes problems by Eigen value and Eigen vector.	Direct teaching: Lectures Aimed teaching: Discovery and oral questions Indirect teaching: Peer Learning	<ul style="list-style-type: none"> • Homework • Quiz • Midterms • Final Exams
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Review of Linear Algebra 1	2
2.	Review of Linear Algebra 1	4
3.	Eigen value and Eigen vector, model matrix, power matrix	2
4.	Vector space, Inner Product space, properties In real and Complex domain	2
5.	Orthogonality, State the Cauchy-Schwarz theorem. State the properties of a vector norm. Give examples of normed linear spaces	2
6.	System of first order odes by Eigen value and Eigen vector	2
7.	Transform 2nd order differential equation to first order systems of odes and solution	4
8.	Linear Transformation , matrix transformation	4
9.	The Jordan form- Function of a matrix- Properties of eA	4
10	Triangular matrix- Caley-Hamilton theorem Characteristic Polynom .	4
...		
Total		30





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid exam	7 th	20
2.	Homework	Through of semester	5
3.	Quiz	Through of semester	10
...	Mid exam	12 th	20
	E.exam	9 th	5
	Final exam	End of semester	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	1) Elementary Linear Algebra with Applications, Francis G. Florey.
Supportive References	Elementary Linear Algebra 11th edition, Howard Anton, Amazon, 2011.
Electronic Materials	http://joshua.smcvt.edu/linearalgebra http://faculty.mu.edu.sa/azedan/Algebra http:// mathforum.org/advanced/numerical.html/ http://www.ingentaconnect.com/ content/ http://www.zentrablblatt-math.org/ zmath/en/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students.
Technology equipment (projector, smart board, software)	
Other equipment (depending on the nature of the specialty)	



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	

