





Course Specifications

Course Title:	Linear Algebra
Course Code:	284MATH-3
Program:	Computer Science + Information System
Department:	Computer Science + Information Systems
College:	Computer Science and Information Systems
Institution:	Najran University





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A. Course Identification

1. Credit hours:
2. Course type
a. University College $$ Department Others
b. Required $$ Elective
3. Level/year at which this course is offered: 5/3
4. Pre-requisites for this course (if any): 342 Math-3
5. Co-requisites for this course (if any): Non

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours	
Contac	Contact Hours		
1	Lecture	45	
2	Laboratory/Studio		
3	Tutorial		
4	Others (specify)		
	Total	48	
Other Learning Hours*			
1	Study	30	
2	Assignments	10	
3	Library	15	
4	Projects/Research Essays/Theses		
5	Office hours	10	
	Total	110	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces types of matrices, properties of matrices and algebraic of matrices. Also, it introduces solving of linear systems, computing determinants of matrices, vectors (in the plane and space), linear combination of vectors, spans and linearly dependent and linearly independent of vectors. Finally, it covers linear transformations, similarity and orthogonal, eigenvalues and eigenvectors of matrix.





2. Course Main Objective

- 1. Providing students the scientific facts and concepts about the types of matrices, properties of matrices and algebraic of matrices.
- 2. Providing students an appropriate amount of information that help to solve linear systems, computing determinants of matrices, know vectors (in the plane and space).
- 3. Distinguish between linearly dependent and linearly independent of vectors.
- 4. Training students on how to find eigenvalues and eigenvectors of matrix.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge:	
1.1	Describe the types of matrices and their properties and write the linear system in matrix form.	
1.2	Recognize between the solutions of linear systems and define concepts of vectors in the plane and space.	
1		
2	Skills :	
2.1	Evaluate the determinants of the matrices.	
2.2	Interpret the eigenvalues as the solutions of the characteristic polynomial.	
2.3		
2		
3	Competence:	
3.1	Operate in the Internet to expand his mind regarding the decision of linear algebra.	
3.2	Apply different methods to learn linear algebra.	
3.3		
3		

C. Course Content

No	List of Topics	Contact Hours
1	Matrices and systems of linear equations: types of matrices, properties of matrices, Algebra of matrices and inverse of matrices.	6
2	Solving linear systems $AX = B$ using elimination method, <i>inverse of matrix, REF and RREF</i> . Determinants: the determinants of the matrix, the properties of determinants, Cramer's rule.	6
3	Introduction to Vector space: Vector definition of 2D and 3D Vector, subspaces, the row and column vectors, linear combination, linearly dependent and independent, basis and dimension.	12
4	Introduction to linear transformations: the definition of a linear transformation, and image and kernel of a linear transformation, types of transformations: reflection, translation, rotation, projection.	9
5	Matrix of linear transformations, similarity and orthogonal matrices, eigenvalues and eigenvectors of matrices.	12
	Tatal	45



D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge:		
1.1	Describe the types of matrices and their properties and write the linear system in matrix form.	- Lecture - Discussions	- Quiz - Written Exam
1.2	Recognize between the solutions of linear systems and define concepts of vectors in the plane and space.	- Lecture - Discussions	- Quiz - Written Exam
2.0			
2.1	Skills :	- Identify induced subgraphs, and proper subgraphs	- Lecture - Discussions
2.2	Evaluate the determinants of the matrices.	- Solve problems involving first and second fundamental forms.	- Lecture - Discussions
	Interpret the eigenvalues as the solutions of the characteristic polynomial.		
3.0			
3.1		- Lecture - Discussions	- Oral Exam
3.2	Competence:	LectureDiscussions	- Oral Exam - Rubrics

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Exercises, Homework& Assignments	Open	10%
2	Oral Exam and Rubrics	14 th Week	5%
3	Quizzes	Open	5%
4	Written Test(1)	7 th Week	15%
5	Written Test(2)	13 th Week	15%
6	Final Exam	End of Semester	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

• Introducing the course syllabus, grading scale and the institution of marks for the course in the first



lecture of the course.

- Arrangements for availability of teaching staff for individual student consultations and academic advice (include amount of time teaching staff are expected to be available each week).
- Office hours for a teaching staff for one hour weekly.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	 Elementary Linear Algebra, Bernard Kolman, Macmilan Publishing Inc. Introduction to Linear Algebra, authored d / Hamid Mustafa Howaidy, Mutanabi Library, 1428
Essential References Materials	 Elementary Linear algebra (7th Edition) By: Howard Anton John Wiley & sons(1994) Hawkins, T., Lebesgues Theory of Integration, University of Wisconsin press, Madison, 1970.
Electronic Materials	- Matlab Software
Other Learning Materials	http://en.wikipedia.org/wiki/Mathematics

2. Facilities Required

Item	Resources	
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture Hall by the number of seats = 30 seat approximately.	
Technology Resources (AV, data show, Smart Board, software, etc.)	 Datashow Smart Board Wi Fi 	
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• None	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student course evaluation survey at the end of semester.	Students	Questionnaire (Indirect)
Effectiveness of teaching and assessment	Peer Reviewer	Rubrics (Indirect)
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Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.) Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council
Reference No.	Session No. 10 (441-38-43300)
Date	17/02/2020



