



Course Specifications

Course Title:	Linear Algebra
Course Code:	202262-3
Program:	Bachelor in Computer Engineering
Department:	Department of Mathematics
College:	College of Computers and Information Technology
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 5/3
4. Pre-requisites for this course (if any): None
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended	0	0
3	E-learning	0	0
4	Distance learning	0	0
5	Other	0	0

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	0
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course is an introduction to linear algebra during a study of linear systems of equations and its solutions methods, and a study of matrices, determinants, operations on matrices and eigenvalues and eigenvectors. Finally, a simple introduction to vector spaces.

2. Course Main Objective

1. Understand the linear systems of equations and its solutions methods.
2. Understand the matrices and the operations on matrices.
3. Understand the determinants and its properties.
4. Defining the vector space and understand the properties of the vector space R^2 and R^3 .

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Ability to solve the system of linear equations by using Gauss-Jordan method.	K1
1.2	Ability to Performs operations on matrices addition multiplication and finding the inverse of a matrix.	K1
1.3	Using the properties of determinants to calculate the value of the determinants.	K1
1.4	Ability to express a vector as a linear combination of some vectors in the space R^2 and R^3 .	K1
1.5	Ability to finding the eigen values and associated eigenvectors of $n \times n$ matrix.	K1
2	Skills :	
3	Values:	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to linear systems the method of elimination.	2
2	Matrices and Gaussian Elimination. {Definition of a matrix the coefficient matrix of a linear system the elementary row operations. Row equivalent matrices	4
3	Gauss Jordan Elimination. {Reduced echelon matrix, Gauss Jordan Elimination method}	5
4	Matrix operations {addition, multiplication by a number, and multiplication rules of matrix arithmetic}	5
5	Inverses of matrices {identity matrix definitions of invertible nonsingular matrix, inverse matrix, and noninvertible singular matrix arbitrary integral	4
6	Determinants {determinants of 2×2 matrices higher order determinants, definitions of minors, cofactors, and $n \times n$ determinants properties of determinants}, determinants and elementary row operations.	5
7	Cramer's Rule and inverse matrices {Cramer's Rule the adjoint matrix finding the inverse of a matrix by determinant and the adjoint matrix}	5
8	Vectors in the plane and in space The Vector space R^2 .3 The Vector space R^3	5
9	Eiegen values and Eiegen vector {the definition of Eiegen values and Eiegen vector Characteristic equation of a Matrix algorithm to finding the eigenvalues and associated eigenvectors of $n \times n$ matrix}.	5
10	Diagonalization of matrices.	5
Total		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 and Understanding		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.1	Ability to solve the system of linear equations by using Gauss-Jordan method.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.2	Ability to Performs operations on matrices addition multiplication and finding the inverse of a matrix.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.3	Using the properties of determinants to calculate the value of the determinants.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.4	Ability to express a vector as a linear combination of some vectors in the space R^2 and R^3 .	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.5	Ability to finding the eigen values and associated eigenvectors of $n \times n$ matrix.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.0	Skills		
3.0	Values		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	3, 5, 7, 8	10%
2	Midterm Exam	8	25%
3	Quizzes	4, 8, 9	15%
4	Final Exam	16	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:

Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	C. H. Edwards, Jr., David E. Penney, 'Elementary linear Algebra', Pearson, latest edition.
Essential References Materials	None

Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Traditional Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show
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
Extent of achievement of course learning outcomes	Students	Indirect (Survey)
Effectiveness of teaching and assessment	Students	Indirect (Survey)
Extent of achievement of course learning outcomes	Faculty	Course Report

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	
Reference No.	
Date	