



Course Specifications

Course Title:	Linear Algebra
Course Code:	202262-3
Program:	Bachelor in Computer Science
Department:	Department of Mathematics
College:	College of Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input 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: 8/3
4. Pre-requisites for this course (if any): NON
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	5	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	50
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	0
	Total	50

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

Understand the linear systems of equations and its solutions methods, understand the matrices and the operations on matrices, understand the determinants and its properties and 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	
2	Skills :	
1.1	Solve the system of linear equations by using Gauss-Jordan method.	S1
1.2	Performs operations on matrices addition multiplication and finding the inverse of a matrix.	S1
1.3	Use the properties of determinants to calculate the value of the determinants.	S1
1.4	Express a vector as a linear combination of some vectors in the space R^2 and R^3 .	S1
3	Values:	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to linear systems the method of elimination.	3
2	Matrices and Gaussian Elimination. {Definition of a matrix the coefficient matrix of a linear system the elementary row operations Row equivalent matrices}	3
3	GaussJordan Elimination. {Reduced echelon matrix Gauss Jordan Elimination method}	3
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}	5
6	Determinants {determinants of 2×2 matrices higher order determinants, definitions of minors, cofactors, and $n \times n$ determinants properties of determinants}	5
7	Determinants and elementary row operations.	5
8	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
9	Vectors in the plane and in space The Vector space R^2	5
10	The Vector space R^3	5
11	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}	3
12	Diagonalization of matrices.	3
Total		50

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		
2.0	Skills		
1.1	Solve the system of linear equations by using Gauss-Jordan method.	Lecture Discussion	Written Exams Quizzes



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		Problem Solving	Assignments
1.2	Performs operations on matrices addition multiplication and finding the inverse of a matrix.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.3	Use the properties of determinants to calculate the value of the determinants.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.4	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
3.0	Values		

2. Assessment Tasks for Students

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

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer “at risk” students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

F. Learning Resources and Facilities



1. Learning Resources

Required Textbooks	C. H. Edwards, Jr., David E. Penney, 'Elementary linear Algebra', Pearson 2011, 10 th Ed
Essential References Materials	NON.
Electronic Materials	NON
Other Learning Materials	NON

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> • A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board. • A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board.
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> • NON
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Students' surveys and Students course evaluation
Improvement of Teaching	Course Coordinator	deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	<ul style="list-style-type: none"> • Review CAF (Course assessment file) • Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another

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	CS council
Reference No.	Meeting #12
Date	23-10-1443

