هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification

(Bachelor)

Course Title:	Engineering Analysis (2)
Course Code:	COE2001
Program:	Bachelor of Construction Engineering
Department:	Civil and Environmental Engineering Department
College:	College of Engineering and Computing in Al-Qunfudhah
Institution:	Umm Al-Qura University
Version:	5
Last Revision Date:	March 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
2. Course type					
A.	☐University	☒ College	☐ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (4/2)					
4. Course General Description:					
This course focuses on the fundamental concepts of matrix algebra and linear systems. Topics covered include matrices, inverses, determinants, eigenvalues, eigenvectors, and vector spaces. The course also explores methods for solving linear systems, such as Gaussian elimination, and introduces linear transformations and their applications. Emphasis is placed on both theoretical concepts and practical problem-solving, including the use of computer applications for linear algebra computations.					
5. Pre-requirements for this course (if any)**:**					
Calculus (2) for Engineering (MTH1182)					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The main purpose of this course is to prepare students to know the basic matrix algebra, list theorems about determinants, classify and solve linear systems of linear algebraic equations, recognize the basic notions of linear systems; vectors; matrix algebra, and vector Spaces, and use computational skills and interpret results accurately.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100 %
2	E-learning	None	None
3	Hybrid • Traditional classroom • E-learning	None	None
4	Distance learning	None None	

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	60
2.	**Laboratory/Studio**	None
3.	**Field**	None
4.	**Tutorial**	None
5.	**Others (specify)**	None
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	know the basic matrix algebra	**K2**	Lecture	Assignment, Quiz, Midterm and final exam
1.2	list theorems about determinant	**K2**	Lecture	Assignment, Quiz, Midterm and final exam
1.3	recognize the basic notions of linear systems, vectors, matrix algebra, and vector spaces.	**K2**	Lecture	Assignment, Quiz, Midterm and final exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.0	**Skills**			
2.1	classify and solve linear systems of linear algebraic equations.	**S1**	Lecture	Assignment, Quiz, Midterm and final exam
2.2	Apply matrix computations, including operations, transformations, and numerical methods, to solve complex engineering problems.	**S1**	Lecture	Assignment, Quiz, Midterm and final exam
2.3	Analyze engineering problems using matrix methods, such as solving systems of equations, eigenvalue problems, and linear transformations.	**S1**	Lecture	Assignment, Quiz, Midterm and final exam
3.0	**Values, autonomy, and responsibility**			
3.1				
…				

C. Course Content

No	List of Topics	Contact Hours
1.	Systems of Linear Equations	**8**
2.	Matrix Algebra	**8**
3.	Determinants	**8**
4.	Vectors and Vector Spaces	**8**
5.	Linear Transformations	**8**
6.	The Eigenvalues Problem	**8**
7.	Special Matrices and Matrix Decomposition	**8**
8	Quizzes and Midterm Exam	**4**
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	**2, 5, 8, 11, 14**	**15%**
2.	Quizzes	**5, 10**	**15%**
3.	Midterm exam	**7 or 8**	**30%**
5.	Final exam	**16 or 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	Introduction to Linear Algebra, 5th International Edition, 2016, Author: Gilbert Strang, Wellesley-Cambridge Press.
Supportive References	Linear Algebra Demystified", David McMahon, McGraw-Hill, 2006.
Electronic Materials	• Electronic materials of the required textbook and its PowerPoints slides • Umm Al-Qura LMS related contents
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Equipped Classroom
Technology equipment (projector, smart board, software)	Blackboard, Data show, Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Student** **Instructor**	**Indirect** **Direct**

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Student Instructor	Indirect Direct
Quality of learning resources	Student Instructor	Indirect
The extent to which CLOs have been achieved	Instructor	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Civil and Environmental Engineering Department Council in Al-Qunfudah**
REFERENCE NO.	**The fifteenth session of the academic year 1446**
DATE	**01/05/2025**