The University of Jordan
School of Engineering
Industrial Engineering Department
First Semester 2019/2020

Course name:	Engineering Analysis
Course code:	IE 0906303
Credits hours	3
Contact hours/room:	11:00-12:00 Sun, Tue & Thu / 101 IE
Course instructor's name, E-mail, and phone:	Wafa' AlAlaween, Ph.D., AFHEA w.alaween@ju.edu.jo 22941
Office hours	12:00-13:00 Sun, Tue & Thu; 10:00-11:00 Mon & Wed
Text book:	Howard Anton, Elementary Linear Algebra, John Wiley & Sons, 10th Edition.
Other reference(s):	-
Course Description:	Linear algebra, vectors, matrices, linear equations and their solution. Transformation methods, Fourier, Laplace, practical applications using MATLAB.
Providing Department:	Industrial Engineering
Prerequisite Course:	1901102 and 0301202
Course type	Mandatory

Assessment Methods:	Method	Weight %	Date
	Midterm Exam	30	TBDL
	Short Exam	10	TBDL
	Quizzes	10	N/A
	Final Exam	50	TBDL

	#	After successful completion of this course, the student will be able to	SO
Course Learning Outcomes:	**CLO1**	Design and understand systems of linear equations. Represent these systems in a matrix form (**Ax**=**b**) and determine when the system has no solution, one solution or infinite number of solutions.	**1**
	CLO2	Perform the basic calculations on the matrices and vectors, and determine the inverse of a matrix using different methods such as the Gauss-Jordan elimination method.	**1**
	CLO3	Solve system of linear equations using Gauss-Jordan elimination method, elementary row operations, Cramer's rule.	**1**
	CLO4	Understand the theoretical workings of the cofactor expansion method and use it to determine the determinant and the inverse of a matrix.	**1**
	CLO5	Understand the theoretical workings of linear transformations.	**1**

	CLO6	Utilize the Matlab software to apply the various methods that are used to solve large-scale systems of linear equations.	1
Brief list of topics	**Credit hours**	**Reading materials**	**Topics**
	16	Ch. 1	Systems of Linear Equations 1. Introduction to System of Linear Equations 2. Gaussian Elimination 3. Matrices and Matrix Operations 4. Inverses; Rules of Matrix Arithmetic 5. Elementary Matrices and a Method for Finding A-1 6. Further Results on Systems of Equations and Invertibility 7. Diagonal, Triangular, and Symmetric Matrices
	6	Ch. 2	Determinants 1. Determinants by Cofactor Expansion 2. Evaluating Determinants by Row Reduction 3. Properties of the Determinant Function 4. A Combinatorial Approach to Determinants
	7	Ch. 3	Vector Spaces 1. Vectors in 2-Space, 3-Space and n-Space 2. Norm, Dot Product, and Distance in Rn 3. Orthogonality 4. The Geometry of Linear Systems 5. Cross Product
	5	-	MATLAB
	5	Ch. 8, 6	Linear Transformations 1. General Linear Transformations 2. Isomorphism 3. Compositions and Inverse Transformations 4. Matrices for General Linear Transformations 5. Similarity 6. Fourier Series 7. Laplace

Important Notes:	• Do not hesitate to ask questions • You are required to bring a notebook and take notes in classes. • Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class. • Discuss the assignments among yourselves • Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an "F" for the course. There will be no exceptions.

	• All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused • Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works. • Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.

The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)				
1	*An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*	5	*An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.*
2	*An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*	6	*An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.*
3	*An ability to communicate effectively with a range of audiences.*	7	*An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*
4	*An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.*		