The University of Jordan
School of Engineering
Mechatronics Engineering Department
2nd Semester – A.Y. 2024/2025

Course Portfolio

for the purpose of ABET accreditation

Course Number:	**MX0908311**
Course Name:	**Engineering Numerical Methods**
Credit Hours:	**3**
Course Type:	**Required**
Course Lavel:	**3rd Year**
Academic Year:	**2024/2025**
Semester:	**2nd**
Total Students:	**15**
Instructor:	**Prof. Zaer Abo-Hammour**

CHECKLIST:
Please indicate below the supporting material you included in the course portfolio whether electronically or in the paper-based file:

	Submit	Audit
1. Course Syllabus (latest revision)	☑	☐
2. Course Assessment by Students (CAS)	☑	☐
3. Course Assessment by Faculty (CAF)	☑	☐
4. Course Report	☑	☐
5. Sample Exams/Quizzes/Projects/Reports/Homeworks (Minimum, Average and Maximum)	☑	☐

Submitter name: **Date of submission:**

Auditor name: **Date of audit:**

The University of Jordan
School of Engineering
Mechatronics Engineering Department
2nd Semester – A.Y. 2024/2025

Course: **Engineering Numerical Methods – MX0908311 (3 Cr. – RequiredCourse)**

Instructor: Prof. Zaer Abo-Hammour
Office: E038, Telephone: 06/5355000 ext 23025, Email: zaer@ju.edu.jo

Course website: http://elearning.ju.edu.jo

Catalog description:

Prerequisites by course:

	301202	Engineering Mathematics I	(pre-requisite)
MX	**908231**	Computer Applications for Mechatronics	

Prerequisites by topic: Students are assumed to have sufficient knowledge pertaining to the following:
1. Calculus (Differentiation, Integration)
2. Linear Algebra
3. Differential Equations
4. Matlab computer language

Textbook: Numerical Methods for Engineers, Chapra S.C. and Canale R.P., McGraw Hill, Latest Edition

References:
1. Numerical Methods for Engineers, Chapra S.C. and Canale R.P., McGraw Hill, Latest Edition
2. Applied Numerical Analysis Using MATLAB, Fausett L.V, Prentice Hall, 1999
3. An Introduction to Numerical Analysi, Atkinson K.E., John Wiley, 2nd Edition, 1997

Course learning outcomes (CLO) and relation to ABET student outcomes (SO):

Upon successful completion of this course, a student should:	[SO]
1. Understand the basic concepts of Numerical Methods and computations including significant figures, integer and floating-point representation, accuracy and precision.	[1]
2. Know different types of numerical errors including truncation and round-off errors, error propagation, and condition number of functions.	[1]
3. Find the roots of equations for nonlinear functions of single variable.	[1]
4. Find the roots of equations for systems of nonlinear equations.	[1]
5. Solve systems of linear algebraic equations.	[1]
6. Introduce the concept of curve fitting.	[1]
7. Apply the methods of regression, interpolation, and splines.	[1]
8 Use MATLAB to perform numerical calculations of all algorithms	[1]

1. Introduction to Numerical Analysis: Area of study in numerical analysis, benefits of studying the numerical analysis, computer and numerical analysis, mathematical subjects area, Approximation and Numerical Error.
2. Roots of Equations: Bracketing Methods, Open Methods, System of Nonlinear Equations.
3. System of Linear Equations: Gauss Elimination Method, Gauss Jordan Method, Decomposition Method, Matrix Inverse, Iterative Methods.
4. Curve Fitting: Introduction, Least Square Regression, Nonlinear Regression Models, Multiple Linear Regression, Multi-Dimensional Regression, Interpolation, Splines
6. MATLAB Programming
9.
10.
11.

CAS: Course assessment by students

Course learning outcomes indirectly assesed by students

Course Number:	**MX0908311**	Academic Year:	**2024/2025**
Course Name:	**Engineering Numerical Methods**	Semester:	**2nd**
Credit Hours:	**3**		
Course Type:	**Required**	Instructor:	**Prof. Zaer Abo-Hammour**

Total students in class: **27**

			1	2	3	4	5	[out of 5]	Evaluating
No.	**Course learning outcome (CLO)**	**[SO]**	**Poor**	**Fair**	**Good**	**V. Good**	**Excellent**	**Average***	**students**
1.	Understand the basic concepts of Numerical Methods and computations including significant figures, integer and floating-point representation, accuracy and precision.	**[1]**	2	1	4	5	5	3.59	15

7.
8.
9.
10.
11.
12.
13.
14.
15.

Course Grades

Course Number:	**MX0908311**	Academic Year:	**2024/2025**
Course Name:	**Engineering Numerical Methods**	Semester:	**2nd**
Credit Hours:	**3**		
Course Type:	**Required**	Instructor:	**Prof. Zaer Abo-Hammour**

Student outcome to be assessed:		[1]	[1]	[1]	[1]																
Description	**Project**																				
Student ID	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**P13**	**P14**	**P15**	**P16**	**P17**	**P18**	**P19**	**P20**
(Optional) **Pts**	**10**																			
220351	**9.5**																			
228440	**10**																			
226033	**7.5**																			
176678	**5.5**																			
215445	**8**																			
207091	**5.5**																			
211253	**9**																			
221962	**5.5**																			
238536	**10**																			
223130	**5**																			
2213251	**6**																			

2210069	**9**																			
224017	**7**																			
237953	**6.5**																			
2220515	**7.5**																			

CAF: Course assessment by faculty

Student outcomes directly assesed by faculty

Course Number: **MX0908311**
Course Name: **Engineering Numerical Methods**
Credit Hours: **3**
Course Type: **Required**

Academic Year: **2024/2025**
Semester: **2nd**
Instructor: **Prof. Zaer Abo-Hammour**

Total students in class: **27**

			[0, 1]	(1, 2]	(2, 3]	(3, 4]	(4, 5]	[out of 5]	Evaluating
Assignment	**Description**	**[SO]**	**Poor**	**Fair**	**Good**	**V. Good**	**Excellent**	**Average**	**students**
P1 *(10 pts)*	Project	[1]	0	0	5	5	5	**4**	15
P2									
P3									
P4									
P5									

NOTE: The Average is calculated based on the following weights: Excellent = 5, Very Good = 4, Good = 3, Fair = 2, Poor = 1, and the number of students who obtained those score levels.

SUMMARY: For a final analysis of individual student outcome (SO) scores from the above CAF results, please see the course report. The final score for a particular SO will be evaluated by considering the scores of the different assignments affecting that SO and combining them using equal weights.

Course Report

Student outcomes as assesed by both faculty and students

Course Number:	**MX0908311**	Academic Year:	**2024/2025**
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Credit Hours:	**3**		
Course Type:	**Required**	Instructor:	**Prof. Zaer Abo-Hammour**

CAS Benchmark: **3** [out of 5] *for satisfactory perofrmance*
CAF Benchmark: **3** [out of 5] *for satisfactory perofrmance*

Total students in class: **55**

[SO]	Student outcome description	CAS Average	CAF Average	Comment
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	**3.59**	**4**	Satisfactory perofrmance

Student actual grade distribution in this class:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	Average
1	2	1	2	3	1	1	1	0	0	1	2	2.42

[out of 4.0]

Instructor's recommendations: **Date:** 07/10/2025

Focus group or ABET committee recommendations: **Date:**

Changes or corrective action taken (if necessary): **Date:**