Jordan University of Science and Technology
Faculty of Engineering
Chemical Engineering Department

CHE202 Numerical Methods For Chemical Engineers - JNQF Level: 7
First Semester 2023-2024

Course Catalog
3 Credit Hours. Introduction to numerical solution, approximations, rounding, and errors, solving non-linear equations, solving system of linear and nonlinear equations, least-squares curve fitting, polynomial interpolation, splines interpolation, numerical differentiation, numerical integration, solving differential equations (ODE?s and PDE?s), computer applications (MATLAB and spreadsheets).

Text Book	
Title	Applied Numerical Methods with Matlab for Engineers and Scientists
Author(s)	Chapra, S.C.
Edition	3rd Edition
Short Name	reference_1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Reference_2	Numerical methods for engineers	Steven C. Chapra, Raymond P. Canale,	7th Edition	
Reference_3	Applied Numerical Analysis.	Gerald, C.F. and Wheatley, P.O.	6th Edition	
Reference_4	www.mathworks.com/academia	Mathworks	8th Edition	

Instructor	
Name	**Mrs. Nesreen Amari**
Office Location	-

Office Hours	Sun : 10:30 - 12:30
	Mon : 09:30 - 10:30
	Tue : 09:30 - 11:30
	Tue : 13:30 - 14:30
	Wed : 13:30 - 14:30
Email	nkamari@just.edu.jo

Class Schedule & Room

Section 1:
 Lecture Time: Sun, Tue : 12:30 - 13:30
 Room: CH2106

Prerequisites

Line Number	Course Name	Prerequisite Type
902030	MATH203 Ordinary Differential Equations	Prerequisite / Pass
902010	MATH201 Intermediate Analysis	Prerequisite / Study
2001140	NE114 Programming For Engineers	Prerequisite / Study

Tentative List of Topics Covered

Weeks	Topic	References
Weeks 1, 2	Introduction to Numeical Methods: Chapter 1	From **reference_1**
Weeks 2, 3	Round-Off and Truncation Errors: Chapter 4	From **reference_1**
Weeks 3, 4	Roots of Equations: Bracketing, Bisection, Newton-Raphson: Chapter 5, & 6	From **reference_1**
Weeks 5, 6	Numerical Solution of Simultaneous Linear Systems and Nonlinear Systems: Matrix Algebra Overview: Chapter 8, 9, 10, 11 & 12	From **reference_1**
Week 6	Introduction to Matlab Chapters 2,3	From **reference_1**
Weeks 7, 8, 9	Curve Fitting:Linear Regression, General Linear Least-Squares and Nonlinear Regression, Polynomial Interpolation: Chapters 14,15 and 17	From **reference_1**
Weeks 10, 11, 12	Integration and Differentiation: Chapters 19 and 21	From **reference_1**
Weeks 12, 13, 14	Ordinary Differential Equations- Initial-Value Problems and Boundary-Value Problems: Chapters 22 and 24	From **reference_1**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**

Students should be able to solve numerical problems and program using using MATLAB [10SO1, 10SO6] [1L7S3]	20%	
Students will demonstrate basic numerical methods for solution to problems of root finding, linear systems, data analysis and curve fitting [10SO1, 15SO6] [1L7S3]	25%	
Students will estimate numerical errors in application of numerical methods. [5SO1, 10SO6] [1L7S3]	15%	
Students should be able to numerically differentiate and integrate functions using Simpson's and Trapezoidal methods [10SO1, 10SO6] [1L7S3]	20%	
Students should be able to numerically integrate ODE using Euler, Huen?s and Runga-Kutta methods [10SO1, 10SO6] [1L7S3]	20%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
45					55	

Relationship to NQF Outcomes (Out of 100%)
L7S3
100

Evaluation	
Assessment Tool	**Weight**
First Exam	25%
Second Exam	25%
Homework + Class activity	10%
Final Exam	40%

Policy	
Policy	Attendance Attendance will be checked at the beginning of each class. University regulations will be strictly followed for students exceeding the maximum number of absences. Homework Homework problems are assigned during lecture and usually due one week later. Late homework will not be accepted. Try to solve the problems independently. The assigned problems will be collected, graded, and returned to you in lecture. Quizzes Quizzes will be part of this course. No make-up quizzes will be conducted except in the case of a documented emergency Student Conduct It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Cheating will not be tolerated in this course. University regulations will be pursued and enforced on any cheating student.