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

CHE452 Applied Mathematics And Modelling For Chemical Engineers - JNQF Level: 7
First Semester 2023-2024

Course Catalog
3 Credit Hours. Introduction to mathematical modeling, modeling steady state processes, degree of freedom analysis, heat integration, solution techniques for ODE?s, distributed models development, Laplace transformation, modeling dynamic behavior of processes, computer applications for model analysis.

Text Book	
Title	Applied Mathematics & Modeling for Chemical Engineers, 2023
Author(s)	Richard G. Rice, Duong D. Do, James E. Maneval
Edition	3rd Edition
Short Name	1
Other Information	March 2023

Course References

Short name	Book name	Author(s)	Edition	Other Information
ref 1	Process modeling, simulation and control for Chemical Engineers	Luyben, W. L	2nd Edition	
ref 2	Process modeling, simulation and control for chemical Engineers (2nd edition).McGraw-Hill	Luyben, W.L. (1990)	2nd Edition	
ref 3	Advanced Engineering Mathematics	Kreyszig E.	9th Edition	(Wiley, 2006)

Instructor	
Name	**Prof. Majdi Al-Mahasneh**
Office Location	CH2 L2 / Faculty Offices

Office Hours	Sun : 09:00 - 09:30
	Sun : 10:30 - 11:30
	Mon : 11:00 - 13:00
	Tue : 09:00 - 09:30
	Tue : 10:30 - 11:30
	Thu : 09:00 - 09:30
	Thu : 10:30 - 11:30
Email	mmajdi@just.edu.jo

Class Schedule & Room

Section 1:
  Lecture Time: Sun, Tue, Thu : 11:30 - 12:30
  Room: E2010

Prerequisites

Line Number	Course Name	Prerequisite Type
224331	CHE433 Chemical Reaction Engineering Ii	Pre./Con.

Tentative List of Topics Covered

Weeks	Topic	References
Weeks 1, 2, 3	Differential equations	From **1**
Weeks 4, 5, 6, 7	Mathematical Modeling	From **1**, From **ref 1**
Weeks 8, 9, 10, 11, 12, 13	Process analysis and Dynamic systems	From **1**
Weeks 14, 15	Solution of PDEs	From **1**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Solve ordinary differential equations, Laplace transform, and material and energy balance calculations [1SO1] [1L7K1]	22%	1st exam, HW and CW
Formulate and build mathematical models to describe physical systems (including macroscopic systems and processes) [1SO1] [1L7S1]	31%	2nd exam, Final exam, HW and CW
Derive mathematical models to solve relevant problems related to heat and mass transport phenomenon and to process dynamics and operation. [1SO1] [1L7S1]	37%	Final exam, HW and CW
Use computer packages (MATLAB and Excel) to solve engineering problems relevant to the topics covered in this course [1SO1] [1L7S1]	10%	HW and CW

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

Relationship to NQF Outcomes (Out of 100%)	
L7K1	L7S1
22	78

Evaluation	
Assessment Tool	Weight
1st exam	25%
2nd exam	25%
Final exam	40%
HW and CW	10%

Date Printed: 2023-12-13