



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

CHE445 Heat & Mass Transfer Lab - JNQF Level: 7

First Semester 2023-2024

**Course Catalog**

1 Credit Hours. Temperature measurements, heat conduction in solids, free and forced convection, thermal conductivity of liquids and gases, shell-and-tube heat exchangers, saturation pressure and throttling, mass transfer and diffusion coefficients of liquids and gases, wetted-wall gas absorption (convective mass transfer).

**Text Book**

Title	Heat and Mass Transfer Laboratory Manual
Author(s)	Rami Jumah
Edition	2nd Edition
Short Name	Lab. Manual
Other Information	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref #1	Heat and Mass Transfer	Cengel, Y. and Ghajar, A.,	5th Edition	
Ref #2	Fundamentals of Heat and Mass Transfer	Incropera, F. P. and Dewitt, D. P.	5th Edition	
Ref #3	Process Heat Transfer	Kern, D.	1st Edition	
Ref #4	Thermodynamics: An Engineering Approach	Gengel, A.Y. and Boles, A.M	6th Edition	
Ref #5	Transport Processes and Separation Process Principles	C.J. Geankoplis	4th Edition	
Ref #6	Mass-Transfer Operations	R.E. Treybal	3rd Edition	

Instructor	
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Instructor	
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Class Schedule & Room
<p>Section 1: Lecture Time: Mon : 11:30 - 14:30 Room: LAB</p> <p>Section 2: Lecture Time: Wed : 11:30 - 14:30 Room: LAB</p>

Prerequisites		
Line Number	Course Name	Prerequisite Type
223471	CHE347 Fluid Mechanics Lab	Prerequisite / Study
223640	CHE364 Mass Transfer	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction	
Week 2	Axial Heat Conduction	From <b>Lab. Manual</b> , From <b>Ref #1</b> , From <b>Ref #2</b>
Week 3	Diffusion of a liquid	From <b>Lab. Manual</b> , From <b>Ref #5</b> , From <b>Ref #6</b>
Week 4	Saturation Pressure & Steam Quality	From <b>Lab. Manual</b> , From <b>Ref #4</b>
Week 5	Thermal Conductivity of Liquids and Gases	From <b>Lab. Manual</b> , From <b>Ref #1</b> , From <b>Ref #2</b>

Week 6	Forced Convection Heat Transfer	From <b>Lab. Manual</b> , From <b>Ref #1</b> , From <b>Ref #2</b>
Week 7	Boiling and Condensation	From <b>Lab. Manual</b> , From <b>Ref #1</b> , From <b>Ref #2</b>
Week 8	Shell and Tube Heat Exchanger	From <b>Lab. Manual</b> , From <b>Ref #1</b> , From <b>Ref #2</b> , From <b>Ref #3</b>
Week 9	Convective Mass Transfer	From <b>Lab. Manual</b> , From <b>Ref #5</b> , From <b>Ref #6</b>

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Identify the basic mechanisms and modes of heat transfer and mass transfer [1] [10SO1] [1L7S1]	40%	
Use conventional and computerized instruments and data acquisition systems [6]. [8SO6] [1L7S2]	20%	
Gain experience on operating and collecting data accurately from heat and mass exchangers [6]. [1SO6] [1L7S2]	20%	
Write technical reports [3] [8SO3] [1L7C2]	10%	
Deliver oral presentations [3] [1SO3] [1L7C2]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
40		20			40	

Relationship to NQF Outcomes (Out of 100%)		
L7S1	L7S2	L7C2
40	40	20

Evaluation	
Assessment Tool	Weight
Lab reports	45%
midterm	15%
final exam	40%

<b>Policy</b>	
Grouping	The class will be divided into 4 groups where each group will perform one experiment/week. In the first week of the semester, the members of each group will be assigned by the instructor(s).
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.
Lab. Reports	<p>Individual reports are required from each student. You may discuss the results with your group members, but the final written report must be an individual effort.</p> <p>Laboratory reports will be due one week after the scheduled experiment. This DEADLINE WILL BE STRICTLY ENFORCED. Reports should be submitted to the instructor during the scheduled lab session. 10% WILL BE DEDUCTED FOR EACH DAY THE LAB REPORT IS LATE.</p> <p>Your report for the first experiment must be a long report, while the remaining experiments are short reports.</p>
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.

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