



ChE 445: Heat and Mass Transfer Laboratory

1 credit hour, 3 contact hour lecture, 1 credit hour Eng.

Instructor

Instructor: Dr. Rami Jumah

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Textbooks & References

A. Textbook

	Textbook 1
Title	Heat and Mass Transfer Lab. Manual
Prepared by	Dr. Rami Jumah
Publisher	-
Year	2020
Edition	-

B. References

1. Çengel, Y. and Ghajar, A., Heat and Mass Transfer, 5th ed., McGraw –Hill, New York, 2015.
2. Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt, Fundamentals of Heat and Mass Transfer, 8th ed., Wiley, New York, 2018.
3. C.J. Geankoplis “Transport Processes and Separation Process Principles”, 4th Ed., Prentice Hall, NJ (2003).
4. R.E. Treybal, “Mass-Transfer Operations”, 3rd Ed., McGraw-Hill, New York, 981.

Specific Course Information

A. Course Catalog:

The students are exposed to the basic instruments and equipment used for measuring the transport properties and studying the basic mechanisms of heat and mass transfer. Collecting and analyzing experimental data and discussing the experimental results in professional reports. The experiments are heat conduction in solids, free and forced convection heat transfer, thermal conductivity of liquids and gases, shell-and-tube heat exchangers, saturation pressure and throttling, mass transfer and diffusion coefficients of liquids and gases, convection mass transfer (wetted-wall gas absorption).

B. Prerequisites or co-requisites

Prerequisites: ChE 347 (Fluid Mechanics Lab.), ChE 345 (Heat Transfer),
ChE 364 (Mass Transfer)

C. Required/Elective or Selected Elective

Required

Objectives and Outcomes*

1. Identify and investigate the basic mechanisms and modes of heat transfer and mass transfer [1,6].
2. Get hands-on experience in using conventional and computerized instruments and data acquisition systems [6].
3. Gain experience on operating and collecting data accurately from heat and mass exchangers [1,2,6].
4. Enhance students technical writing skills [3,5]
5. Gain experience on delivering oral presentations [3,5]

Contribution of Course to Meeting the Professional Component

Relationship to Student Outcomes (%)

1	2	3	4	5	6	7
10	10	20		20	40	

Relationship to Chemical Engineering Program Objectives

PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
Y	Y	Y	-	-	-

Topics Covered

1. Heat conduction in solids.
2. Thermal conductivity of liquids and gases.
3. Free and forced convection heat transfer.
4. Shell-and-tube heat exchanger.
5. Mass transfer and diffusion coefficients of liquids and gases.
6. Convection mass transfer (wetted-wall gas absorption).
7. Saturation pressure and throttling.

Evaluation

Assessment Tool	Expected Due Date	Weight
Quizzes	-	10 %
Long Report	One week after experiment is conducted	10 %
Short Reports	One week after experiment is conducted	25 %
Project/presentation	T.B.A.	15%
Final Exam	According to the University final examination schedule	40 %

* Number in brackets refer to the student outcomes