

ROWAN UNIVERSITY
DEPARTMENT of CHEMICAL ENGINEERING

Course

CHE 06311 01, Heat Transfer

Time

Mon 2:00 - 3:15 PM (ROW 102);

Wed 8:00 - 10:45 AM (ROW 102)

Instructor

Dr. C. Stewart Slater

Professor

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Course Description

This course describes the modes of heat transfer: conduction, convection (forced and natural) and radiation. It presents steady and unsteady-state analysis of heat transfer, types of heat exchangers and heat transfer analysis and design.

Pre-requisites: Principles of Chemical Processes II (C-), Math for Engineering Analysis I (D-), Fluid Mechanics I (C-)

Text

REQUIRED – "Introduction to Heat Transfer," 6th Ed., Incropera, DeWitt, Bergman, Lavine, John Wiley & Sons, New York, 2011.

Hand-outs, and selected reading provided by Dr. Slater

Objectives

- To recognize the relevant modes of heat transfer that occur in industrial, chemical, environmental, and natural processes
- To express rates of heat transfer via different mechanisms using the appropriate mathematical expressions
- To apply conservation of energy requirements to determine rates of energy transfer and temperature distributions in various systems
- To apply the method of resistance analysis in solving heat transfer problems
- To calculate individual heat transfer coefficients inside pipes and outside bodies using correlations or material and energy balances.
- To calculate overall heat transfer coefficients from individual heat transfer coefficients or material and energy balances
- To preliminarily analyze heat exchangers

Content

<u>Week</u>	<u>Month - Day</u>	<u>Reading – (Incropera et al, Ch)</u>	<u>Topic</u>
1	9-2	1, 2	Introduction to Heat Transfer, Intro to Conduction
2	9-7 & 9	3	Conduction (Intro and Steady State One Dimension)
	<i>(No class 9-7, Labor Day Holiday)</i>		
3	9-14 & 16	3, 5	Conduction (Steady State) in One Dimension, Conduction (Unsteady State)
4	9-21 & 23	5	Conduction (Unsteady State)
5	9-28 & 30	6	Introduction to Convection / Exam I

6	10-5 & 7	6, 7	Introduction to Convection, Convection w/External Flow
7	10-12 & 14	7, 8	Convection/External Flow Convection
8	10-19 & 21	8	Convection / External and Internal Flow
9	10-26 & 28	8	Convection / Prep for Labs, Exam II
10	11-2 & 4		Labs
11	11-9 & 11		Labs
	<i>(No class 11-11, CSS @ AIChE Meeting)</i>		
12	11-16 & 18	11	Heat Exchangers/Labs
13	11-23 & 25	11	Heat Exchangers
14	11-30 & 12-2	11	Heat Exchangers
15	12-7 & 9	11	Heat Exchangers / Review
16	TBD		Final Exam
	<i>(specified final exam time TBD during Final Exam week 12-12 to 12-18)</i>		

Topics/Exam times may shift due to time constraints and at the discretion of the instructor

Grading Policy

3 Exams: 90% (29%, 29%, 32%)

Homeworks, labs, professionalism: 10% ($\sqrt{+}$, $\sqrt{-}$, 0)

HWs and labs done on team basis. One homework/lab grade will be assigned for the team for the given assignment. At the end of the semester, homework/lab total points will be distributed among team members using the Felder team peer evaluation system. This provides a way to give an evaluation of individual team members based on their level of contribution to the team.

Final Exam held in the final exam period and will be a comprehensive exam and will include questions from the last the last third of course along with material from earlier chapters. Therefore the exam is cumulative since you need information from the previous sections to solve the problems.

Final course grades may be decreased further based on unprofessional conduct as mentioned below at the discretion of the instructor.

Responsibilities

To succeed in this class, you should come to class prepared, ask questions on points that you do not understand, and attempt all homework problems or assignments. Bring the text book and a calculator to class, since we will be doing problems in class. In this class, if you have not worked diligently on the homework assignments, don't follow what is covered in class, and do not read the book (including the examples/exercises that are in the book), the tests will be difficult. You will need to follow the material presented in class, take good notes and review the notes after class. Doing only one third of the assignments and not paying attention in class while your teammates are diligent is a recipe for disaster in this course. I will lecture on material (that covered in the book and some that is not), make myself available for questions both in and out of class, attempt to answer all serious questions, and administer fair but demanding exams.

If you have a documented disability that may have an impact upon your work in this class, please contact me at the beginning of the semester. Students must provide documentation of their disability to the Academic Success Center in order to receive official University services and accommodations. The Academic Success Center can be reached at 856-256-4234. The Center is located on the 3rd floor of Savitz Hall. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations.

Policies

1. You are responsible for all material covered in class whether you are in class or not. Some material will be drawn from other sources and some topics from the text may be presented differently in class.
2. Late work of any kind will not be graded, you have multiple team members – one must be able to hand in the work for the group on time.
3. Collaboration in study teams for homework/labs/review is acceptable and encouraged, but all tests must be done independently.
4. If you feel that a test problem has been graded improperly (except for miscalculation of points), you must resubmit the problem within 24 hours along with a written appeal and explanation. Upon receipt of this formal appeal, I will regrade the problem. This means that your score may go up or down.
5. Academic dishonesty of any kind will result in failure for the course. Academic dishonesty includes, but is not limited to, copying on an exam, submitting work performed by another as your own, tampering with or in any way altering another persons work without their knowledge and consent, and misrepresenting your contribution to a group project.
6. Professional conduct is required in class at all times. Examples of unprofessional conduct include coming to class late, doing work for another class or activity while in this class, using a cell phone, PDA or other device to talk, text, play games, view internet sites or perform other functions, disrupting your neighbor, etc. Students are not permitted to use a laptop in class unless otherwise instructed to do so.
7. Students are expected to conduct themselves in an acceptable manner at all times. Students who violate public law or the rights of others and interfere with the educational process will be referred to the proper authorities.
8. No audio or video recording, or photographing any class activity without prior consent of the instructor.
9. Course final grade will be reduced for unprofessional conduct in class, failure to follow proper safety procedures, disruptive activity or other behavior as deemed not appropriate.