Prairie View A&M University

Chemical Engineering Department

CHEG 3013-P01: Heat, Mass, and Momentum Transport

Fall 2019 Syllabus

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Office Hours: M 9:30 – 12:30 PM. (or by appointment)

<u>COURSE</u>

Meeting Time: TR 12:30 – 1:50 p.m.

Location: S.R. Collins 331

Prerequisites: CHEG 2053 and MATH 2043 with minimum grades of C

Required Text: Geankoplis, C.J., Transport Processes and Separation Process Principles. 5th Edition,

ISBN: 0-13-101367-X

References: Transport Phenomena, 2nd edition, Bird, Stewart and Lightfoot, Wiley, 2007,

ISBN: 978-0-470-12868-8 (US)

Fundamentals of Momentum, Heat, and Mass Transfer, 5th edition, Welty, Wicks, Rorrer, and Wilson, Wiley, 2008, ISBN: 978-0-470-11539 (US)

Evaluation: This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course. The course has been designed to ensure that students acquire a solid grounding in ABET Outcomes 1.

Description: Viscosity and the mechanisms of momentum transport, shell momentum balances and velocity distributions in laminar flow, equations of change for isothermal systems, equation of motion, continuity, and energy, thermal conductivity and the mechanisms of energy transport, shell energy balances and temperature distributions in solids and laminar flow, diffusivity and the mechanisms of mass transport.

Goals: The goal of this course is to prepare the students in the following:

1. Apply conservation and phenomenological laws.

2. Present, calculate, and report information regarding transport phenomena.

3. Write, simplify, and solve the appropriate equation of change.

4. Ability to analyze, formulate, and solve shell balances.

GRADING POLICY

Items	Weight %
Quizzes/ Participation/Assignments	15 %
Tests (2)	45 %
Homework	5 %
Project	10 %
Final	25 %

Grade Scale: A = 100 - 90

 B = 89 - 80

 C = 79 - 70

 D = 69 - 50

 F = 50 or below

• Students have two weeks to contest any grade. Matters unresolved between the student and instructor must be brought before the department head within 2 weeks of the student meeting with the instructor.

TESTS & TESTING POLICY

• Tests will occur in class and will consist of closed and open book portions.

• One Make up test! The lowest test grade will be deducted

• No electronic device will be allowed including iPads and eReaders.

• No graphing calculators are allowed for any test or quiz. Students must purchase a small scientific

calculator to use on exams. A cell phone cannot be use as a replacement for a graphing calculator on an

exam.

• No bathroom breaks are allowed during a test or a quiz. If a student leaves the room during this time,

their exam/quiz will be collected and considered finished by the student.

• Any sightings of a cellular phone during an exam or a quiz will automatically result in a grade of zero for that student, and the student will be referred to the department head. Such meetings must take place within a week of the violation.

QUIZZES

• Quizzes will be given throughout the semester. Quizzes will be based on material covered in class and homework assignments.

HOMEWORK POLICY & GUIDELINES

• Practice problems have been provided for students on the tentative lecture schedule. These problems are for your independent practice and not for weekly submission.

• Specific homework assignments will be given throughout the semester as the instructor examines the specific need of the class.

• These assignments may be computer based or involve the textbook.

• Students must submit these assignments during a given time frame. **NO late submission, 5 points penalty for not submitting.**

• If a student chooses to disobey the university's honor code and copy the solution manual instead of submitting the student's own independent work, the student will receive a grade of zero on the assignment and will be referred to the department head. Such meetings must take place within a week of the infraction.

• All homework assignments must be submitted on engineering paper.

• Write only on the front of the paper

• **Staple assignment if it is more than one page**.

• Write your name, date, and assignment number on the front page.

• Number your pages! From time-to-time, students staple the pages out of order.

• Homework is due at the beginning of the class period. **Late homework assignments will NOT be accepted!**

CLASS ACTIVITIES AND PARTICIPATION GRADES

   • Class activities will often occur each week.

   • **No late or replacement assignments will be accepted**.

   • These activities may be computer based or involve the textbook.

   • Students must submit these assignments during a given time frame.

   • Cellular phones must remain turned off at all times during the class. Laptop use is prohibited in class. No exceptions, zero tolerance. **Penalty of up to 10 points for using electronics in class**.

BOOK POLICY

• The textbook for this course is REQUIRED. Students without textbooks will eventually fail the course;

therefore, all students without a hard copy (or special cases) of the textbook will be dropped from the course on the 7th class day based on the policy of the College of Engineering.

• Books can be purchased through the bookstore or online.

FINAL EXAM PROCEDURES

• The comprehensive final exam will have a closed book and open book section.

• All students are required to take the final exam. No exemptions are given.

• It is the student's responsibility to arrive on time for the exam with all of the needed materials.

TENTATIVE LECTURE SCHEDULE Fall 2017

Week	Lecture Topics	No. of lectures	Grading
1	Chapter 1: Introduction to Engineering Principles and Units	2	
2	Chapter 2: Principles of Momentum Transfer and Overall Balances Labor day holiday 9/2	2	
3	Chapter 2: Principles of Momentum Transfer and Overall Balances	2	
4	Chapter 3: The Principles of Momentum Transfer and Applications	2	
5	Chapter 3: The Principles of Momentum Transfer and Applications	1	Test 1 09/24
6	Chapter 4: Principles of Steady-State Heat Transfer	3	
7	Chapter 4: Principles of Steady-State Heat Transfer	3	
8	Chapter 4: Principles of Steady-State Heat Transfer	2	
9	Chapter 4: Principles of Steady-State Heat Transfer Chapter 5: Principles of Unsteady State Heat Transfer	2	
10	Chapter 5: Principles of Unsteady State Heat Transfer	1	Test 2 10/29
11	Chapter 5: Principles of Unsteady State Heat Transfer	1	
12	Chapter 6: Principles of Mass Transfer	1	Project due 11/14
13	Chapter 7: Principles of Unsteady-State and Convective Mass Transfer Thanksgiving Holiday Nov 21-25	1	
14	Chapter 7: Principles of Unsteady-State and Convective Mass Transfer.	2	
15	Review for Final December 3, 2019	1	
	Final Exam		

UNIVERSITY RULES AND PROCEDURES

Disability statement (See Student Handbook)

Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook)

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty

1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.

2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.

3. Fabrication: use of invented information or falsified research.

4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook)

Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy

Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have

adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog.

COURSE OUTCOMES

Two major course outcomes will be assessed in this course using a number of performance criteria. The Course outcomes and their performance criteria are detailed below:

Student Outcome 1: **Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics**

1. Ability to identify and formulate momentum and heat transport problems using the principles of mathematics, engineering, and science.

Students are able to:

(i) Apply the conservation of momentum.

(ii) Apply the conservation of energy.

(iii) Apply the conservation of mass.

(iv) Utilize Newton's law of viscosity.

(v) Utilize Fourier's aw of conduction.

(vi) Utilize Newton's law of convection.

(vii) Utilize Fick's law for mass transfer.

2. Ability to solve complex transport problems using computing tools.

(i) Calculate rate of heat transfer through layered wall

(ii) Calculate temperature of a system for unsteady state condition