CHEN 3786 - Transport Phenomena 1

Fall 2026 Syllabus, Section 01, CRN 40738,

Credit hours: 4

Instructor

Vahid Atashbari

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Public Instructor Information

Instructor Title: Assistant Professor
Instructor Professional Qualifications: Ph.D, Petroleum Engineering, The University of Adelaide, 2016
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Course Description

3786. Transport Phenomena 1. Mathematical formulation of conversion laws. Dimensional analysis. Mechanism and fundamentals of momentum and energy transfer with selected applications to analysis and design of chemical engineering equipment. Three hours lecture and three hours computational lab per week. Prereq.: C or better in MATH 2673, MATH 2673H or MATH 2686H and C or better in CHEN 2684. 4 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Fundamentals of Momentum, Heat and Mass Transfer	James Welty, Gregory L. Rorrer, David G. Foster	9781119495413
Optional	Transport Processes and Separation Process Principles	Christie John Geankoplis, Daniel H. Lepek, Allen Hersel	9780137459377
Optional	Fluid Mechanics: Fundamentals and Applications	Yunus A. Cengel, John M. Cimbala	9781264858422

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Week of	Proposed Topic	Due/To Prepare for Class
8/24	Chapter 1 - Introduction to Momentum Transfer Chapter 2 - Fluid Statics	
8/31	Chapter 3 - Description of a Fluid in Motion Chapter 4 - Conservation of Mass: Control-Volume Approach	
9/7	Chapter 5 - Newton's Second Law of Motion: Control-Volume Approach	Quiz 1 - Chapters 1-4
9/14	Chapter 6 - Conservation of Energy: Control-Volume Approach	
9/21	Chapter 7 - Shear Stress in Laminar Flow	Quiz 2 - Chapters 5-6
9/28	Chapter 8 - Analysis of a Differential Fluid Element in Laminar Flow Chapter 9 - Differential Equations of Fluid Flow	
10/5	Chapter 10 - Inviscid Fluid Flow	Quiz 3 - Chapters 7-9
10/12	Chapter 12 - Viscous Flow	
10/19	Chapter 13 - Flow in Closed Conduits	Quiz 4 - Chapters 10 & 12 Midterm Exam - Chapters 1-12
10/26	Chapter 13 - Flow in Closed Conduits Chapter 14 - Fluid Machinery	

11/2	Chapter 15- Fundamentals of Heat Transfer	Quiz 5 - Chapters 13-14
11/9	Chapter 17 - Steady-State Conduction Chapter 18 - Unsteady-State Conduction	
11/16	Chapter 19 - Convective Heat Transfer Chapter 20 - Convective Heat Transfer Correlations	Quiz 6 - Chapters 15-18
11/23	Chapter 21 - Boiling and Condensation Chapter 22 - Heat Transfer Equipment	
11/30	Overview	Quiz 7 - Chapters 19-22
12/7		Final Exam - Dec 11 : 10:30-12:30

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.