Transport Phenomena

ECH 6285 Section CAMP
Class Periods: Monday (12:50 pm -2:45 pm) and Wednesday (12:50 pm – 1:40 pm)
Location: HPNP G-316
Academic Term: Fall 2025

Instructor:
Jason E. Butler
E-mail: butler@che.ufl.edu
Office Location: Materials Engineering 205B
Office Hours: Every Tuesday and Thursday – 4:15 pm to 5:15 pm

Supervised Teacher:
Amrabadi Touraj
E-mail: tourajamrabadi@ufl.edu
Office Hours: Mondays (3:15- 4:15) and Wednesdays (11:30-12:30)

Course Description
3 credits; Integrated introduction to transport processes in continuous media with emphasis on fluid mechanics and heat and mass transfer.

Course Pre-Requisites / Co-Requisites
Admission to the ChE graduate program or by consent of instructor, dependent upon prior background in undergraduate fluid mechanics and heat and mass transfer, at a level required to obtain an undergraduate degree in Chemical Engineering.

Course Objectives
Upon completion of this course, a student is expected to be able to formulate, solve, and analyze advanced problems in transport phenomena in fluid mechanics and heat and mass transfer. Specific topics covered will include:

- Heat transport
  - o Heat equation, non-dimensionalization
  - o Steady and unsteady heat problems
- Mass transport
  - o Diffusion equation and problems
  - o Convection-diffusion equation, non-dimensionalization, and problems
  - o Mass transport with reactions, non-dimensionalization, and problems
- Momentum transport
  - o Continuity equation, Navier-Stokes equation, non-dimensionalization
  - o Boundary conditions, steady flow problems
  - o Lubrication flows

Materials and Supply Fees
None

Required Textbooks and Software
"Analysis of transport phenomena"
2nd Edition, by William M. Deen.
ISBN: 978-0-19-974028-4

Course Schedule
Review ODEs and Vector Calculus (Appendices A and B)
Chapter 1: Read pgs 1-13
Chapter 2: Read pgs 26-44
Chapter 3: Read all
Chapter 4: Read all
Chapter 5: Read all
Chapter 6: Read all
Chapter 7: Read all
Chapter 8 (creeping flows) or Chapter 9 (boundary layer flows)

Important Dates
Exam 1, Monday, September 29th (subject to change)
Exam 2, Monday, November 3rd (subject to change)
Exam 3, Thursday, December 11th at 12:30
Note that all exams will be cumulative.

Evaluation of Grades
Grading will be based on three examinations during the course of the semester. The final score will be computed by weighting the highest of the three exam scores at 40% and the remaining two exams at 30% each. If the exam scores are E1, E2, and E3, then your final grade (G) is

$$G = 0.40 \cdot \max(E1,E2,E3) + 0.30 \cdot (E1+E2+E3-\max(E1,E2,E3))$$

Grading Policy

Percent	Grade	Grade Points
>85	A	4.00
80.0 – 84.9	A-	3.67
75 - 79.9	B+	3.33
70 – 74.9	B	3.00
65 – 69.9	B-	2.67
60 – 64.9	C+	2.33
55 – 59.9	C	2.00
<55	C-	1.67

- Note that a B- is required for doctoral students to continue in the program.
  C is required for masters students to continue in the program.

- The instructor guarantees these grades if you earn the posted percentages.
- The instructor may decide to lower the thresholds needed to attain the grades listed above, but will not raise the threshold.
- Award of partial credit on individual questions will be made on a basis specified by the instructor and will be consistently applied.
- Graders will attempt to assess the value of all work accurately; however, you should present solutions that are neat and well thought-out to maximize your grade.
- Clearly identify solutions by boxing all final and intermediate answers.
- Include enough details to justify your solutions.

Academic Policies & Resources
To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu