Spring 2020

CHE 624-102: Transport Phenomena (Revised for Remote Learning)

David Venerus

CHE 624
Transport Phenomena
Spring 2020

Instructor: David C. Venerus
204 LSEC, venerus@njit.edu
Office Hours: Mon & Wed 9:00-10:30 AM, or by appointment.

Teaching Assistant: Chadakarn (Gift) Sirasitthichoke
312 Tiernan cs437@njit.edu
Office Hours: Tues & Fri 4:00-5:30 PM, or by appointment.

Course Objective: To analyze momentum, heat and mass transfer phenomena that occur in chemical, materials, and biological processes with an emphasis on problem formulation, solution and interpretation.

Textbook:
A Modern Course in Transport Phenomena (MCTP), D.C. Venerus & H.C. Öttinger, Cambridge U. Press (2018).

Reference:
Transport Phenomena , R.B. Bird, W.E. Stewart & E.N. Lightfoot (BSL) John Wiley & Sons (2002).

Canvas: Announcements, assignments, solutions etc., posted at https://canvas.njit.edu

Grading: Exam 1 (~~30~~40%), ~~Exam 2 (30%)~~, Final Exam (~~30~~40%), Exercises (~~10~~20%)

Exercises: Graded (2,1,0) by Teaching Assistant and solutions posted on Canvas.

Computer Skills: Several problems will be assigned that require basic numerical methods to solve. It is the student's responsibility to be familiar with the use of computing software such as MATLAB, Mathematica, or similar computing tools.

ADA Statement: Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Office of Accessibility and Resources. Please go to https://www.njit.edu/studentsuccess/accessibility/ for further information.

Academic Integrity: The NJIT Honor Code and Standards of Academic Integrity will be enforced in this course. Any violation will be immediately brought to the attention of the Dean of Students. Students are encouraged to read and be familiar with the University Code on Academic Integrity, which can be found at https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

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Outline (MCTP)

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1. Introduction (1.1-1.3) and Math Review
2. The Diffusion Equation (2.1-2.4)
3. Equilibrium Thermodynamics (4.1-4.6)
4. Balance Equations (5.1-5.4)
5. Forces and Fluxes (6.1-6.6)
6. Measuring Transport Coefficients (7.1-7.5)
   EXAM 1
7. Pressure-Driven Flows (8.1-8.5)
8. Heat Exchangers (9.1-9.3)
9. Gas Absorption (10.1-10.3)
10. Driven Separations (11.1-11.2)
    ~~EXAM 2~~
11. Thermodynamics of Interfaces (13.1-13.4)
12. Interfacial Balance Equations (14.1-14.3)
13. Transport Around a Sphere (17.1-17.3)
14. Bubble Growth and Dissolution (18.1-18.5)
    FINAL EXAM