

CHE 624
Transport Phenomena
Spring 2024

Instructor: David C. Venerus

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Office Hours: Mon & Wed 1:00-2:30 PM, or by appointment.

WebEx link: <https://njit.webex.com/meet/venerus>

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: Midterm Exam (40%), Final Exam (40%), Exercises & Class Participation (20%)

Exercises: Submit hard copy on due date; graded (2,1,0); 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. Further information can be found at:

<https://www.njit.edu/studentsuccess/accessibility/>

Academic Integrity: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

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Transport Phenomena
Outline (MCTP)

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)**
MIDTERM EXAM
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)**
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)**
FINAL EXAM