

COLLEGE OF CHEMISTRY COURSE GUIDE (../INDEX.HTML)

MAJORS (../MAJOR.HTML)

LIST OF COURSES (COURSES.HTML)

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CBE 150A - TRANSPORT PROCESSES (4 UNITS)

COURSE OVERVIEW

SUMMARY

This course is the first course of the 150 series. It covers fluid mechanics and heat transfer, while 150B covers mass transfer. The professor emphasizes derivations at the microscopic level to create a foundational basis of understanding of transport processes. The course heavily focuses on solving material and energy balances as applied to chemical engineering problems. The course requires previous calculus knowledge including solving ordinary differential equations. The principles learned in this course are applied throughout all other chemical engineering courses.

PREREQUISITES

CBE 140 (cbe140.html), Math 54 (math54.html) (May be taken concurrently)

TOPICS COVERED

- Fluid mechanics
 - Couette Flow
 - Newtonian fluids, viscosity
 - Fluxes/driving forces
 - Shear stress
 - Conservation of mass
 - Macroscopic balances

- Steady-state and unsteady-state
- Continuity equation
- Microscopic conservation of momentum
- Cauchy momentum equation
- Conservation of energy
- Entropy balance
- Viscous losses in fittings and valves
- Flow in pipes, friction factor
- Laminar and turbulent flow
- Navier-Stokes Equations
- Heat Transfer
 - Conduction
 - Convection

WORKLOAD

COURSEWORK

- Weekly problem sets
- 2 Midterms
- Final exam

TIME COMMITMENT

3 hours of lecture and 1 hour of discussion per week, ~6-8 hours per problem set per week.

CHOOSING THE COURSE

WHEN TO TAKE

This course is typically taken immediately after CBE 140 during the second year. The course is typically taken concurrently with CBE 141.

WHAT NEXT?

- CBE 150B ([cbe150b.html](#)) (Transport and Separation Processes)
- CBE 142 ([cbe142.html](#)) (Kinetics and Reactor Design)

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