

CBE 361L (1 Cr.) – Chemical Engineering Fluid Laboratory

Fall Semester 2025

Karen M. Swindler Department of Chemical and Biological Engineering

South Dakota School of Mines & Technology

2025.08.19

COURSE SYLLABUS

Instructor: Travis W. Walker

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Office Hours: TBD and by appointment

Chemical Equipment and Instrumentation Specialist: Joseph T. Hilsendeger

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Graduate Teaching Assistant: Kelly Sutko

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Office: Graduate Office, CBEC 113

Office Hours: TBD

Prerequisites: CBE 218**Dates:** 2025.08.25-2025.12.17**Laboratories:** M52 – T 1400-1650**Classroom:** CBEC 131/225 & CBEC 3304**Course Description:** CBE 361L Chemical Engineering Fluid Laboratory

Credits: (3-0) 3

Laboratory experiments in fluid flow, fluid flow measurements, and design of fluid handling systems.

CRN: M52 – 73183

Course Website<https://d2l.sdbor.edu/d2l/home/2073886>**Required Textbook/Materials**

L.G. Bauer, et al., “Manual for Chemical Engineering Laboratories,” 6th Edition, SDSM&T, 2005 (revised 2019).

Recommended Textbook

N. de Nevers. *Fluid Mechanics for Chemical Engineers*. McGraw Hill (1991).

Other Textbooks

M. Abramowitz, I.A. Stegun. *Handbook of Mathematical Functions: with Formulas, Graphs, and Mathematical Tables*. Dover (1965). Web Link.

R.B. Bird, W.E. Stewart, E.N. Lightfoot, *Transport Phenomena*, 2nd ed. John Wiley & Sons, New York (1999). ISBN 0-47011-539-4.

W.E. Boyce, R.C. DiPrima. *Elementary Differential Equations and Boundary Value Problems*. Wiley (2009).

A. Varma, M. Morbidelli, *Mathematical Methods in Chemical Engineering*. Oxford University Press (1997).

Course Grading

Participation	20%
Memorandum 1	10%
Oral Presentation 1	10%
Formal Report	20%
Oral Presentation 2	10%
Memorandum 2	10%
Poster Presentation	10%
Final Examination	10%

Grade Policy: Work received up to 24 hours late will receive 50% credit. Work received beyond 24 hours late will receive 0% credit. Group work on homework is permitted, but each student must submit his or her own individual assignment with a list of contributors.

Grading: If you determine that a regrade is necessary, the entire assignment will be regraded.

Final performance percentage will be assigned a minimum letter grade by the following scale (implying that the percentage requirements for a particular grade may be decreased at the instructor's sole discretion but will not be increased):

90-100	A
80-90	B
70-80	C
60-70	D
00-60	F

Course Objectives and Rationale: This lab will include 6 different experiments to expose students to unit operations common in industrial settings.

- Experiment 3-1 Flowmeters – Flowmeters
- Experiment 3-2 Centrifugal Pump – Head-flow rate characteristics of a centrifugal pump
- Experiment 3-3 Pressure Drop – Pressure drop in long straight pipes
- Experiment 3-4 Fluidized Bed – Pressure drop and fluid velocity in a fluidized bed
- Experiment 3-5 Rotameter – Rotameter calibration
- Experiment 3-6 Viscometer – Brookfield viscometer

Course Outcomes: By the end of the course, a student will be able to do the following:

- Formulate a plan of investigation for studying/troubleshooting a piece of process equipment/unit operation.
- Collect quality raw data from an operation, and interpret it based on understanding of the chemical engineering principles.
- Manipulate experimental data in a manner that optimizes interpretation and analysis using chemical engineering principles, compare observed with predicted performance, and recommend improvements to the system based on sound chemical engineering judgment and safety.
- Communicate the results of data analysis effectively in written and oral reports.
- Function effectively in a lab team, and take leadership roles within the team.

Course Structure

Communication

The course website will be used to distribute information, while email to MINES addresses will be used for course communication. I do my best to answer emails as promptly as possible, but I reserve the right to have 24 hours to answer all email inquiries. Under certain circumstances this timeline could be longer.

Tentative Dates

- **Classes**
 - August 26
 - September 02, 09, 16, 23, 30
 - October 07, 14, 21, 28
 - November 04, 18
 - December 02, 09
- **No Classes**
 - November 11 (Veteran's Day)
 - November 25 (Thanksgiving)

Important Dates

Add/Drop 2025.09.04
Final Examination 2025.12.12 1600-1750

Academic Integrity: South Dakota Mines is committed to academic honesty and scholarly integrity. The South Dakota Board of Regents (BOR) Policy 2.9.2 provides a comprehensive definition of “Academic Dishonesty,” which includes cheating and plagiarism. All Instructors at South Dakota Mines are required to report allegations of academic misconduct to the Student Conduct Officer. BOR Policy 3.4.1 provides detailed information regarding key definitions, policy information, prohibited conduct, and the Student Conduct process adhered to at South Dakota Mines. Any student suspected of violating academic integrity standards will be reported in accordance with the process outlined on the South Dakota Mines website.

Academic Freedom Statement: Academic Freedom is the cornerstone upon which higher education is built. Academic freedom, as defined by BOR Policy 1.6.1, is fundamental to the advancement of truth, development of critical thinking, promotion of civil discourse, and contribution to the public good. Each course includes the freedom to discuss relevant matters and present various scholarly views in the classroom, as determined by the subject-matter expertise of the instructor. Students are encouraged to develop the capacity for critical thinking and to pursue the truth, debate ideas, express and evaluate their opinions, and draw conclusions. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.¹

¹Language adapted from the American Association of University Professors “Joint Statement on Rights and Freedoms of Students.”

Complaint Process: While we hope that every student has a meaningful and positive experience at South Dakota Mines, should a concern arise, students are encouraged to first attempt to resolve their concern directly with the person or office directly involved. Following that attempt, should the concern remain unresolved, students are encouraged to reach out to the Dean of Students office at DeanOfStudents@sdsmt.edu or 605.394.2416. Additionally, students may access the online form to submit their complaint, appeal, or grievance.

Grade Appeal Policy: In alignment with BOR Policy 2.9.1, and SDSMT Policy 2-21, students who wish to appeal their final course grade shall first discuss the matter with the course instructor. If the concerns are unresolved following that discussion, students may appeal to the instructor’s department head or supervisor for a decision. If the student is dissatisfied with the supervisor decision, the student may then utilize the online form to submit “Appeal – Academic” for a “Grade Dispute.”

Opportunity for All – Student Success Services and Support: Students are provided a one-stop source for information regarding all the services and supports to ensure success. Visit the Opportunity Center page to learn more.

South Dakota Board of Regents Required Syllabus Statements: The following statements may be found online in South Dakota Board of Regents Academic Affairs Council Guideline 2.7.3.A(1):

- Freedom in Learning,
- Americans with Disabilities Act,
- Academic Dishonesty and Misconduct,
- Acceptable Use of Technology, and
- Emergency Alert Communications.