

MECH 342: Fluid Mechanics



WALTER SCOTT, JR.
COLLEGE OF ENGINEERING
COLORADO STATE UNIVERSITY

Instructor:

Mohammad Abutayeh

E-mail: abutayeh@colostate.edu

Web: <https://www.engr.colostate.edu/me/>

Description:

The course covers basic fundamentals of fluid properties, fluid statics, fluid equations, viscous effects, and ideal fluid flow are applied to engineering problems in closed conduits, and fluid measurements.

Prerequisite:

MATH 340 and PH 141 and MECH 337, may be taken concurrently.

Textbook:

WileyPlus online version is required: Munson, Young, Okiishi, *Fundamentals of Fluid Mechanics*, 8th edition, Wiley & Sons, ISBN 978-1-119-49922-0.

Disability Accommodation:

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 requires Colorado State University to provide academic adjustments or accommodations for students with documented disabilities. Students seeking academic adjustment or accommodations must self-identify with the Office of Resources for Disabled Students (ORDS). After meeting with ORDS staff, and based on their recommendations, students are encouraged to meet with their instructors to discuss their needs, and if applicable, any lab safety concerns related to their disabilities.

Resources:

The CSU Writing Center is an excellent resource to support the development of your writing skills throughout your college career. While students are not required to access services, you are strongly encouraged to seek consultation on your writing projects required for this course. In addition to contact information, there are useful resources available on their [website](#). The Morgan Library reference librarians can direct you to books and articles for the research paper and the oral presentation.

Professional Honesty:

This course adheres to the [Academic Integrity Policy](#) of the Colorado State University General Catalog and the Student Conduct Code. Honors students enrolled in this course are held to high standards of integrity. Academic integrity is expected within all assignments for this course. Students will be required to make an honor pledge to complete this course. The honors pledge will be completed as a class. It is expected that students will use their own knowledge and skill for assignments unless directed to do otherwise. Incidents of cheating, plagiarism or knowingly providing false or incorrect information are considered serious and will be treated seriously. Consequences of these incidents are at the discretion of the faculty member involved and may consist of confiscation of assignments, an F-grade, or reporting to the CSU Student Conduct office. It is expected that students will demonstrate concern for others, respect the confidentiality of information about, the property of and the decisions made by others.

Assessment:

Course learning outcomes are assessed using the following rubric:

Homework	30%
Exam I (Chapters 1 – 4)	35%
Exam II (Chapters 5 – 9)	35%

Learning Outcomes:

- Sound knowledge of basic concepts of fluids and problems in fluid mechanics.
- Sound knowledge of atmospheric pressure and its measurements.
- Sound knowledge of fluid statics: center of pressure, forces on plane & curved immersed surfaces.
- Sound knowledge of the Bernoulli equation, concepts of static, dynamic, and total pressures.
- Sound knowledge of concepts of fluid kinematics: velocity and acceleration fields.
- Ability to identify a control volume and apply conservation of mass, momentum and energy.
- Sound knowledge of differential analysis of fluid flow and its many applications.
- Ability to apply the Buckingham PI theorem to develop a set of dimensionless variables.
- Sound knowledge of concepts compressible flows.

Topics:

Week	Chapter	Topic
1	1	Introduction
2	2	Fluid Statics
3		
4	3	Fluid Dynamics
5		
6	4	Fluid Kinematics
7		
8	5	Control Volume Analysis
9		
10	7	Dimensional Analysis
11		
12	8	Internal Flow
13		
14	9	External Flow
15		