

# Unified – Fluid Dynamics

## Learning Objectives - Students in Unified will learn to:

The learning objectives are stated in the context that the fluid dynamics material treated in Unified Engineering is at the introductory level and that most students will not have had a previous course in fluid dynamics at the university sophomore level. The learning objectives are also influenced by the fact that many of the Unified Engineering students will not take another course in fluid dynamics during their MIT undergraduate program. Students graduating from Unified Engineering and having successfully pass fluid dynamics should:

- Explain the physical properties of a fluid and the consequence of such properties on fluid flow
- Identify the fundamental kinematics of a fluid element
- State the conservation principles of mass, linear momentum, and energy for fluid flow
- Apply the basic applied-mathematical tools that support fluid dynamics
- Create models of inviscid, steady fluid flow over simple profiles and shapes
- Determine the basic forces and moments acting on simple profiles and shapes in an inviscid, steady fluid flow

## Measurable Outcomes - Students graduating from Unified will be able to:

- Classify and exploit fluids based on the physical properties of a fluid
- Compute correctly the kinematical properties of a fluid element
- Apply correctly the conservation principles of mass, linear momentum, and energy to fluid flow systems with emphasis on aerodynamics
- Demonstrate the ability to model correctly inviscid, steady fluid flow over simple aerodynamic profiles and shapes
- Compute the lift, drag, and moments acting on simple aerodynamic profiles and shapes in inviscid, steady fluid flows

## Assessment Strategy

- Survey each students' entering knowledge of basic flow mechanics and aerodynamics
- Retain copies of A, B, and C level performances on written assignments and quizzes