

Engineering Fluid Mechanics

Course Objectives

At the completion of this course, all students will meet the following objectives.....

Fluid Behavior

1. Students will be able to employ scientific understandings about fluids (both verbally and in writing) using **specific jargon** and perform calculations or estimates using **correct mathematical relationships** among variables
2. Students will be able to define or determine **fluid properties**

Mechanics. Mechanics is the scientific study of force, motion, and energy.

Students will be able to perform mathematical analyses, and use verbal or written communication to describe understanding of the following **concepts of fluid mechanics**:

1. **Force:** Pressure, Hydrostatic force on a plane surface, Equilibrium, Buoyancy, Momentum principles, Lift, Form and Skin Friction Drag, and Shear Stress
2. **Energy:** Pressure variation in a static field, Bernoulli Equation, Energy principle, Head Loss
3. **Motion:** Velocity, Discharge (volumetric flow rate), Mass flow rate, Streamlines, Laminar and Turbulent Flow, Velocity Profile, Pipe Flow, Open Channel Flow
4. **Dimensional Analysis**

Doing Engineering

Students will be able to perform typical engineering activities using knowledge from the discipline of fluid mechanics. Specifically,

1. Students will be able to estimate (no calculator needed)
2. Students will be able to use verbal or written communication to describe the thinking that occurs during problems solving
3. Students will be able to solve unfamiliar problems by using an organized approach that features strategies and reasoning
4. Students will be able to carry and cancel units, and will do so with all written calculations
5. Students will be able to define scientific concepts using operational definitions
6. Students will be able to team while performing all of these engineering activities