



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

ME 3410 Fluid Mechanics
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Explore fluid mechanics topics:
 - a. Define engineering fluid mechanics
 - b. Describe the main characteristics of liquids, gases, and fluids
 - c. Describe density and specific weight.
 - d. Apply Ideal Gas Law (IGL) equations
2. Examine fluid properties and viscosity equation:
 - a. Define system, boundary, surroundings, state, steady state, process, and property.
 - b. Determine fluid properties
 - c. Characterize mass, weight, viscosity, surface tension, and thermal energy
 - d. Describe viscosity effects
3. Analyze fluid statics:
 - a. Describe Pressure, calculate pressure changes associated with elevation changes, and pressure measurements
 - b. Solve for forces on plane and curved surfaces
 - c. Solve buoyant forces
4. Analyze fluid motion:
 - a. Describing streamlines, streaklines, and pathlines
 - b. Define velocity, velocity field, and acceleration
 - c. Apply Euler's and Bernoulli equation
 - d. Describe and calculate pressure field
 - e. Explain three causes of pressure variation
5. Apply continuity equation to control volumes:
 - a. Solve problems that involve flow rate equations
 - b. Explain control volume approach
 - c. Solve problems that involve continuity equation
 - d. Examine cavitation
6. Formulate the momentum principle and solve problems involving fluid mechanics
 - a. Examine Newton's Second Law of Motion and solve problems
 - b. Derive the linear momentum equation and calculate the momentum flow
 - c. Apply the linear momentum equations to solve problems
 - d. Describe moving control volumes
 - e. Examine Navier-Stokes equation

7. Analyze fluid flow through energy equation
 - a. Define work, energy, pump, and turbine
 - b. Describe conservation of energy
 - c. Examine the most important ideas about energy equation
 - d. Apply energy equation to solve problems
 - e. Solve problem that involve efficiency and power equation
 - f. Calculate the head loss for a sudden expansion and forces on transitions
 - g. Differentiate Bernoulli and energy equations
 - h. Sketch hydraulic and energy grade lines
8. Explore fluid properties, statics, kinematics, flow, and principles through lab experiments
 - a. Determine the viscosity of oil using a concentric cylinder viscometer
 - b. Demonstrate pressure variation with elevation in a liquid and determine the specific gravity of de-ionized water c
 - c. Determine the specific gravity of de-ionized water using a U-tube manometer
 - d. Demonstrate the buoyant force and determine the specific gravity of de-ionized water.
 - e. Determine the static force exerted by a fluid on a submerged surface
 - f. Examine the laminar, transitional, turbulent flow and velocity profiles through Osborne Reynold's experiment and determine the Reynold's number
 - g. Demonstrate Bernoulli's Theorem and its limitations using the Bernoulli's Theorem demonstration apparatus
 - h. Apply linear momentum equation to a water jet apparatus and measure the reaction force
 - i. Verify the pipe friction equation using the Energy Losses in Pipes apparatus

These SLOs are not approved for experiential credit.

Effective: Fall 2017