Course Title   : **FLUID MECHANICS**
Course Number   : **58461**
Field   : **ME, CE**
Credits   : **3**
Prerequisite   : **DIFFERENTIAL EQUATIONS**
Prepared by   : **Mahdi Sani**

Course Objective:

This course provides students with the basic capabilities required to deal with systems involving fluids.

Outlines

1. Introduction: Fluids, Viscosity, Ideal gas law, Vapor pressure, Surface tension.

2. Fluid statics: Pressure, Standard atmosphere, Manometry, Hydrostatic force on surfaces, Buoyancy, Fluid in rigid body motion

3. Basic fluid dynamics: Bernoulli equation, Static/total/stagnation pressures, Energy line/HGL

4. Kinematics: Eulerian description, Streamline/streak line/path line, Material derivative, Control volume, Reynolds transport theorem

5. Control volume: Continuity/momentum/angular momentum equations, Thermodynamic laws

6. Differential analysis: Continuity/momentum equations, Inviscid flow, Basic potential flows, Stress deformation relations, Navier-Stokes equations, Parallel plates, Couette flow, Flow in tubes, Introduction to numerical methods

7. Similitude and dimensional analysis: Buckingham Pi theorem, Common dimensionless numbers, Modeling and similitude, Governing equations and similitude

Text Book: Munson B.R., Young D.F., Okiishi T.H., "Fundamentals of Fluid Mechanics", John Wiley & Sons

References and Supplementary Readings: Cengel Y.A., Cimbala, J.M., "Fluid Mechanics: Fundamentals and Applications", McGraw-Hill