- Course Number and Title: M E 530. Intermediate Fluid Mechanics

- Catalog Description: Incompressible, viscous flows of Newtonian fluids. Derivation of continuity, Navier-Stokes and energy equations, discussion of some simple exact solutions, low Reynolds number flow approximations, boundary layer theory and equations, introduction to vortex dynamics and turbulence, 1D, isentropic, compressible flows, and shocks and expansions waves.

- Credit Hours: 3 Credits (3)

- Prerequisite(s) / Corequisite(s): Prerequisite(s): M E 338 or Consent of Instructor
  Corequisite(s): None

- Required: Graduate Core

- Course Availability: Spring Semester

- Instructor (Usual): Dr. Banavara Shashikanth (See https://mae.nmsu.edu/people/faculty.html)

- Textbook:
  1) Pijush, K Kundu and Ira M. Cohen, *Fluid Mechanics*, 5th ed., Academic Press, 2012.
  2) White, Frank M., *Viscous Fluid Flow*, 3rd ed., McGraw-Hill, 2006
  3) Schlichting, H., (translated by J. Kestin), *Boundary Layer Theory*, 7th ed., McGraw-Hill, 1979

- Course Learning Objectives: After completing this course, a student should be able to:
  Possess a basic knowledge of incompressible, viscous flows of Newtonian fluids, boundary layers and boundary layer behavior, vortex dynamics and 1D isentropic compressible flows, shocks and expansion waves

- Topics Covered:
  - Conservation laws and governing equations
  - Some exact solutions of incompressible flows at high and low Reynolds numbers
  - Boundary layer theory and equations
  - Introduction to 1D, isentropic, compressible flows
  - Introduction to vortex dynamics and turbulence