**1st First week (1 lecture):** Introduction;

**2nd week (5 lectures):** Definition of a fluid, fluid as a continuum, velocity field, flow visualization (NSF video), timeline, pathline, streakline, streamline, Stress field, Deformation rate, viscosity, Newtonian and non-Newtonian fluids;

**Assignment #1**: 2.1, 2.7, 2.15, 2.31, 2.41, 2.51, 2.59

**3rd week (5 lectures):** Fluid statics – Pressure, basic equation and variation of pressure for incompressible liquids and gases. [*Also read the derivation of pressure being independent of orientation from F. M. White’s text.*], hydrostatic forces on submerged surfaces (only plane ones, not curved); Reynolds Transport theorem, Conservation of mass.

**Assignment #2:** 3.21, 3.23, 3.26, 3.45, 3.51, 3.52, 3.66, 4.13, 4.17, 4.25, 4.35, 4.38.

**4th week (5 lectures):** Momentum equation for inertial CV, Momentum equation for CV with rectilinear acceleration, differential analysis of fluid motion – conservation of mass, Motion of a fluid particle, substantial derivative, rotation of a fluid element.

**Assignment # 3:** 4.63, 4.65, 4.67, 4.72, 4.78, 4.82, 4.87, 4.100, 4.103, 4.142, 4.151, 4.175, 5.7, 5.19, 5.39, 5.49, 5.69, 5.86, 5.87.

**5th week (2 lectures):** Angular deformation and linear deformation of fluid element, Differential equation of motion.

**6th and 7th week**: Total 3 quizzes (~40 minutes quiz each).

**8th week (3 lectures):** Examples of velocity profiles obtained by using the differential equations of motion.

**Assignment # 4**: Try all the different problems discussed in the lectures. Attempt to solve them numerically using one of the software packages discussed in class. Compare your analytical solutions to those from the package. This will give you an understanding of how to solve a given engineering problem, even if an analytical solution can’t be obtained.

**9th week (ongoing, 3 lectures till today):** Examples of velocity profiles obtained by using the differential equations of motion – continued. Euler’s equation, Bernoulli equation, applications of the Bernoulli equation.