

## **Fluid mechanics**

### **Undergraduate 3 credit course in Polymer Engineering curriculum**

#### **Amirkabir University of Technology**

**Chapter 1: fluid mechanics terminology** (fluid mechanics scope, Dimensions and Units, information. Definition of stress, density, viscosity...)

**Chapter 2: Fluid statics** (thermodynamics of fluids, Fluid statics, barometers, manometers, stability, hydro static forces)

**Chapter 3: Integral relation for control volume** (Newton law - Bernoulli law continuity relation, conservation of energy and momentum)

**Chapter 4: Differential relation for fluid flow** (Navier stokes equations)

**Chapter 5: Dimensional Analysis** (Dimensional Analysis and Flow Similarity)

**Chapter 6: Viscouse flow in pipes and channels** (Incompressible pipe flow, Reynolds number, turbulent and laminar flow in pipes, pressure drop in pipes, open channels)

**Chapter 7:Pumps, Mixers , Non Newtonian fluids**( pumps: relations and design, Mixers: relations and power graph, introduction to Non Newtonian fluids concept)

**Chapter 8: Compressible flow, Ideal gas ,Two phase flow , filtration**,(introduction to : Compressible flow, Ideal gas in pipes, compressors ,Two phase flow , filtration)

#### References:

1. Fluid Mechanics V. L.Streeter
2. Fluid Mechanics for Chemical engineering students, Holland
3. Fluid Mechanics: Frank M. White, McGraw-Hill , Seventh Edition
4. Mechanics of Fluids: Irving ShamesG.