Elif Soyer Fall 2023, Marmara University

**Class Hours** 

Monday 13:00 – 15:00

Thursday 13:00 – 15:00

4 hours / week

Class documents will be uploaded on Dropbox Do not hesitate to contact me if you have any questions!

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#### TOPICS / LECTURES

- Dimensions, Dimensional Homogeneity, Units, System of Units
- Characteristics of Fluids, Analysis of Fluid Behavior, Density, Specific Weight, Specific Gravity, Ideal Gas Law, Viscosity, Compressibility of Fluids, Vapor Pressure, Surface Tension
- Fluid Statics, Pressure, Pressure Variation in a Fluid at Rest, Measurement of Pressure, Manometry
- Forces due to Static Fluids, Hydrostatic Force on a Plane Surface, Hydrostatic Force on a Curved Surface
- Buoyancy & Flotation
- Flow of Fluids and Energy Equation
- Reynolds Number, Laminar Flow, Turbulent Flow, Energy Losses due to Friction (Darcy's Equation, Hazen-Williams Formula, Manning's Equation)
- Velocity Profiles for Circular Sections and Flow in Noncircular Sections
- Minor Losses
- Flow Measurement

References & Textbooks

Munson, B.R., Young, D.F., Okiishi, T.H, Huebsch, W.W. (2009) Fundamentals of Fluid Mechanics, 6<sup>th</sup> Ed. Wiley

Chapter 1: Introduction

**Chapter 2: Fluid Statics** 

Chapter 3: Elementary Fluid Dynamics – The Bernoulli Equation



#### References & Textbooks

Mott, R.L., Untener, J.A. (2016) Applied Fluid Mechanics, 7<sup>th</sup> Ed. Pearson

Chapter 1: The Nature of Fluids and The Study of Fluid Mechanics

Chapter 2: Viscosity of Fluids

Chapter 3: Pressure Measurement

Chapter 4: Forces due to Static Fluids

Chapter 5: Buoyancy and Stability

Chapter 6: Flow of Fluids and Bernoulli's Equation

Chapter 7: General Energy Equation

Chapter 8: Reynolds Number, Laminar Flow, Turbulent Flow, and Energy Losses due to Friction

Chapter 9: Velocity Profiles for Circular Sections and Flow in Noncircular Sections

Chapter 10: Minor Losses

Chapter 15: Flow Measurement



**References & Textbooks** 

Houghtalen, R.J., Akan, A.O., Hwang, N.H.C. (2017) Fundamentals of Hydraulic Engineering Systems, 5<sup>th</sup> Ed. Pearson

Chapter 1: Fundamental Properties of Water

Chapter 2: Water Pressure and Pressure Forces

Chapter 3: Water Flow in Pipes

Chapter 9: Water Pressure, Velocity, and Discharge Measurements



**References & Textbooks** 

Finnemore, E., Franzini, J. (2001) Fluid Mechanics with Engineering Applications, 10<sup>th</sup> Edition, McGraw-Hill

Chapter 1: Introduction Chapter 2: Properties of Fluids Chapter 3: Fluid Statics Chapter 4: Basics of Fluid Flow Chapter 5: Energy in Steady Flow Chapter 9: Forces on Immersed Bodies Chapter 11: Fluid Measurement

#### **Fluid Mechanics**

with Engineering Applications Tenth Edition



**Grading Policy** 

Midterm Exam-1 (20-26 Nov)

Midterm Exam-2

Quizzes/Homeworks

Laboratory Sessions

Final Exam

Midterm Activities – 60%

Final Exam – 40%

#### **Course Activities Folder**

#### Dropbox.com

The invitation link to the folder **«ENVE2061\_Fall2023**» should be accepted to be a member of the folder and see all activities in the class, including practice problems, lecture notes, assignments, etc.

The e-mail addresses in BYS will be used.