AKM 204E- FLUID MECHANICS
2018-2019 Spring CRN 22092

Instructor   : Hakan Öksüzoğlu
Student meeting hours   : See http://web.itu.edu.tr/hoksuzoglu/ for up to date hours
Course hours   : Monday 15:30-17:30 and Thursday 16:30-17:30 (D318)

Course Description
General topics, Hydrostatics, Kinematics, Conservation equations in integral form, Linear momentum theorem, Bernoulli equation and applications, Navier-Stokes equations, Dimensionless numbers, Similarity, Flow in pipes, Laminar and turbulent flows, Friction in pipes, Losses in pipes, Turbomachinery.

References
1- F. M. White, **Fluid Mechanics**, 7th Edition, 2011
   (Translation: K. Kırkköprü, E. Ayder, Literatür Yayınevi, 2016).
2- Y.A. Çengel , J.M. Cimbala, **Fluid Mechanics Fundamentals and Applications**, 3rd edition, McGraw-Hill, 2013 (Translation: T. Engin, Palme Yayıncılık, 2015).
3- B.R. Munson, D.F. Young and T. H. Okiishi, 2006, **Fundamentals of Fluid Mechanics**, 5th Edition, J. Wiley and Sons (Translation: N. Yücel, N. Dinler, H. Türkoğlu, Z. Altaç,
4- P. J. Pritchard, Fox and McDonald's **Introduction to Fluid Mechanics**, 8th Edition, 2011 (Translation: A. Pınarbaşı, Palme Yayıncılık, 2015).
5- V.L. Streeter, E.B. Wylie, **Fluid Mechanics**, McGraw Hill, 1983.
6- J.H. Shames, **Mechanics of Fluids**, Mc Graw Hill, 1992.

Aim of the course
1. Introduce the fundamental concepts of fluid mechanics
2. Describe the general equations and principles of fluid mechanics.
3. Gain ability to formulate and solve fluid dynamic problems

Abilities supported by the course :
1. Knowing the distinctions and similarities between liquids and gases.
2. Solving problems related to shear stresses in fluids
3. Ability to apply hydrostatic rules to daily problems
4. Measuring/calculating velocity profiles in a flow
5. Learning how to measure velocity, volumetric flow rate and pressure
6. Ability to form dimensionless groups
7. Analyzing pipe flows, calculating pressure drop along a pipe
8. Ability to distinguish flows based on their compressibility, steadiness, viscous behavior, etc.
9. Calculating forces that act on objects
10. Pump and turbine characteristics

Weekly schedule:

Week	Topics
1	Introduction and Basic Concepts, Properties of Fluids
2	Pressure and Fluid Statics, Hydrostatics
3	Pressure and Fluid Statics, Linear Acceleration , Rotation
4	Fluid Kinematics
5	Reynolds Transport Theorem: Continuity and Momentum Equation
6	Continuation (**Midterm 1**)
7	Linear Momentum Analysis
	Mid-Semester Break
8	Reynolds Transport Theorem: Energy and Bernoulli Equations
9	Continuation
10	Internal Flows, Laminar and Turbulent Flows
11	Internal Flows, Major-Minor Losses, Moody diagram
12	Dimensional Analysis and Modelling (**Midterm 2**)
13	External Flow, Drag and Lift
14	Turbomachinery and Applications

Grading:
Midterms   : 2   % 25 + % 25
Quiz   : 2   % 5 + % 5
Final exam : 1   % 40

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Midterm 1 Mar 11, 2018 Monday 15:30
Midterm 2 Apr 29, 2018 Monday 15:30
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All announcements will be made on the following website:
http://www.ninova.itu.edu.tr
In order to be able to take the final exam:
- You should **attend** at least **70%** of the classes and achieve at least **35/100** as an **average** of the midterm exams.