

- Instructor** : Dr. Hakan Öksüzöğlü
- Phone & e-mail** : (0212) 293 13 00 / 2464 & [hoksuzoglu@itu.edu.tr](mailto:hoksuzoglu@itu.edu.tr)
- Lecture hours** : Monday **10:30-12:30** and Wednesday **8:30-9.30**, A201
- Office hours** : see <http://web.itu.edu.tr/hoksuzoglu/index.htm> for up to date hours, Room 435
- Prerequisites** : Fluid Mechanics I (AKM 208E)

**Course Description:**

Viscous Flow in pipes and ducts. Laminar and turbulent boundary layers. Major and minor losses in pipes. Flow over immersed bodies. Boundary layer equations, Potential Flow, Introduction to CFD, Compressible flow. Fluid Machinery. Water hammer.

**Textbook:**

F. M. White, **Fluid Mechanics**, 7<sup>th</sup> Edition, McGraw Hill, 2011  
(Translation: K. Kırkköprü, E. Ayder, Literatür Yayınevi, 2016).

**Other References:**

1. Y.A. Çengel , J.M. Cimbala, **Fluid Mechanics Fundamentals and Applications**, 3rd edition, McGraw-Hill, 2013 (Translation: T. Engin, Palme Yayıncılık, 2015)
2. 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, Nobel Yayınevi, 2013).
3. P. J. Pritchard, *Fox and McDonald's Introduction to Fluid Mechanics*, 8th Edition, 2011 (Translation: A. Pınarbaşı, Palme Yayıncılık, 2015).
4. J.H. Shames, **Mechanics of Fluids**, McGraw Hill, 1992.
5. V.L. Streeter, E.B. Wylie, **Fluid Mechanics**, McGraw Hill, 1983.

**Objectives:**

1. To introduce the basic principles of fluid mechanics.
2. To be able to define, formulate and simplify the equations of fluid flow and gain ability to use them for the solution of fluid flow problems.

**Outcomes:**

*Successful students of the course are intended to gain:*

1. Ability to make calculations and use Moody diagram to determine the local losses and resistance to flow in pipe systems
2. Knowledge of lift and drag concepts over immersed bodies and their simple calculations
3. Knowledge of potential flow concept and ability to use them, ability to implement CFD approach,
4. Ability to take care of compressibility effects in the flow systems.
5. Knowledge of pump and turbine characteristics; ability to choose the right pump or turbine for a given flow system
6. Knowledge of water hammer and ability to make simple calculations.

## 2016/2017 Spring AKM 209E - COURSE PLAN:

Week	Topics
1	General Characteristics of Pipe Flow, Fully Developed Laminar Flow, Fully Developed Turbulent Flow,
2	Dimensional Analysis of Pipe Flow, Major and Minor Losses, Serial and Parallel Piping, Flowmeters
3	Continuation
4	General External Flow Characteristics, Boundary Layer Characteristics, Drag, Lift
5	Continuation
6	Continuation ( <b>Midterm</b> )
7	Potential Flow and CFD
	<i>Spring Break</i>
8	Continuation
9	Compressible flow
10	Continuation
11	Continuation ( <b>Midterm</b> )
12	Turbomachinery and applications
13	Continuation
14	Water hammer

### **Grading Scale:**

1. Midterm Exam:	% 25	15 March 2017 18:00 Wednesday
2. Midterm Exam:	% 25	26 April 2017 18:00 Wednesday
Term Project:	% 10	
Final Exam:	% 40	

### **Final Qualification:**

- You should attend at least **70%** of the classes and achieve at least **35/100** as an average of the midterm exams to qualify for the final exam.

### **Other:**

(1) There will be a Ninova page for the course.

(2) Course raw final grade must be a minimum of 80/100 to get letter grade **AA**. Students who have a course raw final grade less than **40/100** will have a letter grade **FF**.