

Instructor : Dr. Hakan Öksüzöğlü
Phone & e-mail : (0212) 293 13 00 / 2464 & hoksuzoglu@itu.edu.tr
Lecture hours : Monday **10:30-12:30** and Wednesday **9:30-10.30**, **A201**
Office hours : see my web page for up to date hours, Gümüşsuyu **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**”, 4th Edition, McGraw Hill, 1999

Other References:

1. B.R. Munson, D.F. Young and T. H. Okiishi, “**Fundamentals of Fluid Mechanics**”, 5ed, J. Wiley and Sons, 2006.
2. V.L. Streeter, E.B. Wylie, “**Fluid Mechanics**”, McGraw Hill, 1983.
3. J.H. Shames, “**Mechanics of Fluids**”, McGraw Hill, 1992.
4. Cengel, Y.A. and Cimbala, J.M., “**Fluid Mechanics (SI Units): Fundamentals and Applications**”, McGraw Hill, 2009.

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.

2014/2015 Spring AKM 209E - COURSE PLAN:

Week	Topics
1	General Characteristics of Pipe Flow, Fully Developed Laminar Flow, Fully Developed Turbulent Flow, Dimensional Analysis of Pipe Flow, Major and Minor Losses, Serial and Parallel Piping, Flowmeters
2	Continuation
3	Continuation
4	General External Flow Characteristics, Boundary Layer Characteristics, Drag, Lift
5	Continuation
6	Continuation
7	Potential Flow and CFD (Midterm 1, Mar. 21)
8	Continuation
9	Compressible flow
10	Continuation
11	Continuation
12	Turbomachinery and applications
13	Continuation (Midterm 2, May 2)
14	Water hammer

Grading Scale:

1. Midterm Exam:	% 20
2. Midterm Exam:	% 20
Term Project:	% 10
Homework:	% 0 (Exam preparation)
Final Exam:	% 50

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 **45/100** will have a letter grade **FF**.