



Ewha International Summer College

Course Syllabus

Fluid Mechanics

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Home Univ.: Ewha Womans University
Dept.: Division of Mechanical and Biomedical Engineering

Description: Fluid Mechanics is a basic discipline in mechanical engineering concerned with the mechanics of fluids including mainly gases and liquids. In this course, students will learn basic properties of fluids, and the concepts of pressure and buoyancy through hydrostatic analyses. To analyze the motion of flow, the governing equations will be introduced in integral forms using control volume method. Then, the governing equations in differential forms will be discussed. The flow in a duct will be briefly discussed to improve students' design skills.

Objective: Students will learn the basic concepts of fluid mechanics, and how to analyze the motion of fluids. Students will learn how to design a fluidic system.

Prerequisite:: [Textbook] Fluid Mechanics (8th Ed.) by Frank M. White, McGraw-Hill Education (ISBN: 9789814720175)
- Required to take **Calculus** or equivalent course
- Highly recommended to take **Engineer Mathematics**

| Credits | 3 | Contact Hours | 45 |
|---------|-----------|--|----|
| Week 1 | 6/25(Thu) | Introduction to Fluid Mechanics & Basic Fluid Properties | |
| Week 2 | 6/29(Mon) | Flow Patterns, Pressure & Pressure Gradient | |
| | 6/30(Tue) | Pressure Distributions & Center of Pressure (CP) | |
| | 7/1(Wed) | Hydrostatic Forces & Basic Physical Laws of Fluid Mechanics | |
| | 7/2(Thu) | The Reynolds Transport Theorem & Conservation of Mass | |
| Week 3 | 7/6(Mon) | Momentum Equations I & II | |
| | 7/7(Tue) | Momentum Equations III & Bernoulli Equation I | |
| | 7/8(Wed) | Midterm | |
| | 7/9(Thu) | Bernoulli Equation II & III | |
| Week 4 | 7/13(Mon) | Differential Equation of Mass Conservation (Continuity) & Differential Equation of Linear Momentum I | |
| | 7/14(Tue) | Differential Equation of Linear Momentum II (Navier-Stokes Equations) & Stream Function | |

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|--------|-----------|--|
| | 7/15(Wed) | Incompressible Viscous Flows & Principles of Dimensional Homogeneity |
| | 7/16(Thu) | Pi Theorem & Non-dimensionalization |
| Week 5 | 7/20(Mon) | Viscous Flow in Ducts I & II |
| | 7/21(Tue) | Finals |

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|---------------|---------|-------|------------|-------------|---------------|------|
| Evaluation(%) | Midterm | Final | Attendance | Assignments | Participation | Etc. |
| | 35% | 40% | 0% | 15% | 10% | 0% |

※ Applicants with intent for more than one course are asked to make up a syllabus for each, repeatedly using the above template.

- Homework has to be submitted to the Cyber Campus (cyber.ewha.ac.kr) by the indicated deadlines.
 - ✓ Either scanned or photographed will be acceptable, but all answers should be clearly readable.
 - ✓ No delayed homework is allowed.
 - ✓ One silver bullet is given to every student to remove their lowest score of homework.
- More than 9 absences (10 or more) will result in F grade according to the school rules.
 - ✓ After 3 absences, each absence is equivalent to 2% of your participation out of 10%.
(i.e., up to 3 absences, it does not affect your participation score.)
- Grading: Not solely on a curve (Absolute scale + relative scale)