

Introduction to Fluid Mechanics (for SIE)

(Environmental Engineering – SIE; Spring Semester 2025)

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Welcome. This is the first course in fluid mechanics that provides the basics for many of your future courses in Environmental Engineering including hydrology, hydraulics, environmental transport phenomena, process engineering, design, and water resources. We will follow the book entitled: 'Engineering Fluid Mechanics' by Elger, Williams, Crowe and Roberson (available in the bookstore). It is recommended that each student purchases a copy from La Boutique as both the lectures and exercises will follow this book and it will serve to expand on topics covered in class. This is also an important reference for your future career as an engineer and of course a fundamental reference for more advanced classes you will take later in your BS and MS. We look forward to this semester together – please ask questions during lectures and participate actively in problem sessions.

Homework (10% of final grade): Weekly assignments are given (typically 7 – 10 problems) each Monday **on Moodle** and are to be handed in **on Moodle** before the deadline (normally Wednesday of the following week). Late homework is not accepted as we grade 3 problems (selected at random) and will give feedback directly on Moodle. The problem session is run as an “office hour” period, meaning you need to work seriously on the homework before attending next Monday morning's exercise session and come up with prepared questions if you have some difficulty or general questions. Ideally, you should easily finish the homework each week by Friday so you do not need to do it over the weekend! We will post solutions on the Moodle web page of this course. If you do the homework and understand the principles, you will have no problem with the exams. You can work on the homework with your classmates of course (in fact you should) – you should not simply copy, however – make sure you have worked through each one carefully and understood the key points. Again, if you conscientiously do your homework and understand the material you will be well prepared for the exams.

Exams (90% of final grade): First midterm exam (March 19th) (20% of final grade); Second midterm exam (May 7th) (20% of final grade); Final exam during exams week (50% of final grade) – it is a comprehensive exam with an emphasis on later material. For the Mid-term and final exams, you are allowed to bring an A4 sheet of paper (both sides allowed) with handwritten equations so that you don't have to memorize them. Note, however, that it is NOT allowed to write problem solutions. If you need any table from the appendix of the book, we will provide it.

Topics covered: - Chapters 1&2: Fluid properties; Chpt 3: Statics; Chpt 4: Flowing fluids and pressure variation; Chpt 5: Control volume and continuity; Chpt 6: Momentum Eqn.; Chpt 7: Energy Eqn.; Chpt 8: Dimensional analysis and similitude; Chpt 9: Surface resistance; Chpt 10: Flow in conduits; Chpt 11: Drag and lift; Chpt 13: Flow measurements; Chpt 15: Open Channels.