

Syllabus: PME 210401, 2023 Spring

Thermal and Fluid Science II

Extra enrollment

You can submit the extra enrollment request online. If you are in the process of enrollment without access to eLearn, please send me an email at peijyang@pme.nthu.edu.tw.

<https://curricul.site.nthu.edu.tw/p/406-1208-212677,r7797.php?Lang=zh-tw>

Instructor

Dr. Patricia Yang	楊佩良	peijyang@pme.nthu.edu.tw Room 620, Engineering Building I
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Time and Location

<i>Lecture</i>	M5 M6 R5	Room 213, Engineering Building I
<i>Online Platform</i>	<i>eLearn</i>	Announcements and grades are posted online. https://elearn.nthu.edu.tw
Office Hour	TBD	Room 213

Readings

The class scope is defined by the lecture slides following the order of the textbook. Besides the slides, below are suggested readings that might be helpful. Homework problems are from the textbook.

<i>Textbook</i>	Fundamentals of Fluid Mechanics, SI version, 9th Edition https://www.worldcat.org/title/1338157633
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<i>Lecture slides</i>	These slides and the accompanying videos are a family heirloom from PME professors, and they are far from perfect. You are not allowed to share those outside the class.
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Topics and Goals

The class covers mainly fluid mechanics including chapters 1 to 8* in the textbook. In this class, we will learn from the beginning. After this class, you will be able to

- Identify dimensions and physical quantities and the relationship between thermal dynamics and fluid mechanics
- Calculate the pressure in manometers, the force on plan areas, and the force of buoyancy
- Describe fluid motion and apply Bernoulli equation
- Define control volume and analyze fluid motion with energy and momentum equations (integral forms)
- Calculate proper dimensions with dimensionless analysis
- Analyze laminar and turbulent flows in the closed channel

- Identify external flows including boundary layer theory and airfoils with lift and drag (*if time permits).

Grading

30% Midterm + 30% Final + 20% Quizzes + 10% Laboratory + 10% Project. The final grade will be curved to match the average over the past years.

Midterm, Final, and Quizzes

Written exams and quizzes will be given **in-class** in Engineering Building I. You have to bring your **student ID** with you. The goal is to test your understanding of the lecture and homework problems. All are closed book and closed notes. No electronic devices may be used.

Laboratory

The **in-class** laboratory is the fluid visualization experiment in the wind tunnel. The grade is based on the attendance and the laboratory report. Further details will be announced.

Project

The project is to analyze the lift and drag forces on racing car using simulation software. Further details will be announced.

Grading Questions

All grading questions must be brought up **within one week** after the grades are posted. It is your responsibility to visit me or the TAs if you have questions regarding the grades. Once the test sheet is returned, the grade is finalized.