Everything about PME 210402, 2024 Spring
Thermal and Fluid Science II

English, asynchronized, X-Class

本課程為英文授課、英文教材,教師與助教以英文講解,考題、講義均為英文,專有名詞使用英文,不另翻譯。如閱讀本課程大綱有困難者,請勿修習。

Extra enrollment (Extra selection)

1. Submit the extra enrollment request online.

   https://curricul.site.nthu.edu.tw/p/406-1208-212881,r1383.php?Lang=en

2. Meet with me at 13:20 on Feb 19 or Feb 26.

X-Class enrollment

1. Fill out the X-Class form.

   https://curricul.site.nthu.edu.tw/var/file/208/1208/img/209/xclass_e_version_112_3.pdf

2. Paint over times when you could make office hours weekly.

   https://whenisgood.net/pme210402

3. Email me to set up a meeting.

   peijyang@pme.nthu.edu.tw

4. Get the signature of approval from your advisor.

5. Submit the form to the Division of Curriculum (Course-offering Department).

   https://curricul.site.nthu.edu.tw/index.php

6. Enroll the course online.

Instructor

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

Time and Location

Online Platform	eLearn	Lecture videos, announcements, and grades. https://elearn.nthu.edu.tw
Office Hour	M5	Room 213, Engineering Building I TBD for X-Class students
TA class	R5 R6	Room 213

Teaching Assistants

Laboratory	Guan-Yu (Peter) Chen	陳冠宇	apeter0831@gmail.com (Head TA)
	Yung-En (Anny) Chen	陳咏恩	anny1063@gmail.com
TA class	Yu-Ting (Tina) Lin	林于婷	yuting0121.dry@gmail.com
	Tzu-Chen(Peter) Ku	顧子震	kutzuchen@gapp.nthu.edu.tw
	Hao-Ping (Jeffery) Wang	王浩平	jeffery890824@gmail.com

Readings

The class scope is defined by <u>the lecture video</u> following the order of the textbook. Besides the lecture video, below are suggested readings that might be helpful.

Lecture slides   These slides are short outlines of the lecture video.

Textbook   Fundamentals of Fluid Mechanics, SI version, 9th Edition
https://www.worldcat.org/title/1338157633
Many contents of the textbook are <u>not </u>in the scope of this course.

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

Ch 1,7a Dimensionless Analysis I.
Identify dimensions and physical quantities and the relationship between thermal dynamics and fluid mechanics (PI theorem).

Ch 2   Fluid Statics.
Calculate the pressure in manometers, the force on plan areas, and the force of buoyancy.

Ch 3   Fluid Kinematics I.
Describe the fluid flow experimentally and theoretically.

Ch 4   Fluid Kinematics II.
Describe fluid motion and apply Bernoulli equation.

Ch 5   Integral (control volume) Analysis
Define control volume and analyze fluid motion with energy and momentum equations

Ch 6   Differential Analysis I.
Describe the inviscid and viscous flow field mathematically (Navier-Stokes Equations)

Ch 7b   Dimensionless Analysis II.
Apply similitude and model the flow systems at varying scales.

Ch 8*   Differential Analysis II. * if time permits
Analyze laminar and turbulent flows in the closed channel

Grading

30% Midterm + 30% Final + 20% Quizzes (4 quizzes) + 10% Laboratory + 10% Project. The final grade will be curved to match the average over the past years in PME210402.

Midterm, Final, and Quizzes

The goal is to measure the knowledge of this course with relevant math/physics skills. It measures your understanding of the concept and ability to solve problems <u>relatively among your peers</u>, not what you have seen.

Written exams and quizzes will be given <u>in-class</u> at R213 and other rooms in Engineering Building I. You have to bring your <u>student ID</u> with you. All are closed book and closed notes. No electronic devices may be used.

Laboratory

The laboratory is the fluid visualization experiment in the wind tunnel. The grade is based on the attendance and the laboratory report. Absence in the wind tunnel lab receives zero points in the laboratory.

Prelab report	5%	Flow over the cylinder using the simulation software ANSYS.
Postlab report	5%	Flow over the cylinder in the wind tunnel experiment.

Racing Car Project

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

Grading Questions

All grading questions must be brought up <u>within one week</u> 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.

Ethics Statement on Generative Artificial Intelligence

Students enrolled in this course should be aware that they are **not allowed to** submit assignments, reports, or personal reflections generated using artificial intelligence. If such usage is discovered, instructors, the institution, or relevant units have the right to reevaluate the assignment or report or withhold scores. Students enrolled in this course agree to the above ethics statement if registering for the class.