



Philadelphia University  
Mechanical Engineering Department  
Faculty of Engineering

Course Syllabus	
Course Title	Thermal Fluid II
Course Number	(640345)
Course Level	4 <sup>th</sup> year
Prerequisites	Thermal Fluid I (640343)
Text Book	Fundamentals of Thermal-Fluid Sciences “ Yunus A. Cengel, R”, Second Edition
Department	Mechanical Engineering

**Course Description:**

To make the students develop and enhance the knowledge and awareness of fluid mechanics and heat transfer and its applications in practice. The students will be introduced to fluid properties and hydrostatics forces and learn to link the concepts and applications of Bernoulli's & Euler's to flowing fluids, the concept of control volume approach including the principles and applications of continuity, momentum, energy. Also, The study the concept of dimensional analysis and its importance for analyzing model studies and for correlating the results of experimental research to their everyday world and previously learned concepts will be introduced. However, the students should have background knowledge in statics and calculus.

**Course Objectives:**

Upon completion of this course the student should be able to understand the following:

- Fluid Properties.
- Fluid Statics on Plane and Curved Surfaces. Concept of buoyancy, Stability of Immersed and Floating Bodies.
- One-Dimensional Continuity, Bernoulli's and Euler's Equations and its applications.
- Impulse & Momentum Principles and its applications.
- Energy Equations and its applications.
- The Concept of Dimensional Analysis.

Course Academic Calendar		
Week	Subject	Notes
Oct 10	Introduction and Fluid Mechanics	Chapter 1 0
Oct 17	Fluid Statics	Chapter 11
Oct 24	Fluid statics	Chapter 11
Oct 31	Bernoulli and Energy Equations	Chapter 12
Nov 7	Bernoulli and Energy Equations	Chapter 12
Nov 14	Momentum Analysis of Flow Structures	Chapter 13 <i>Eid Adha Holiday</i> Nov 16-20
Nov 21	Momentum Analysis of Flow Structures	Chapter 13 <b>EXAM I (Nov 22-30)</b>
Nov 28	Flows in Pipes	Chapter 14
Dec 5	Flows in Pipes	Chapter 14
Dec 12	Flows over Bodies: Drag and Lift	Chapter 15
Dec 19	Flows over Bodies: Drag and Lift	Chapter 15
Dec 26	Mechanics of Heat Transfer	Chapter 16 <b>EXAM II Dec (22-30)</b>



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Jan 2	Mechanics of Heat Transfer	Chapter 16
Jan 9	Steady Heat Conduction	Chapter 17
Jan 16	Steady Heat Conduction	Chapter 17
Jan 23	FINAL EXAMS (Jan 23 – Feb 1)	

### Assessment Instruments

Evaluation of students' performance (final grade) will be based on the following three categories:

- **Exams.** Two in-class exams will be given. Each will cover about 6-weeks of lectures
- **Final Exam:** The final exam will cover all the class material.

Allocation of Marks	
Exam I	15%
Exam II	15%
Quizzes	20%
Final Exam	50%

Other class work will include:

- **Quizzes.** Three 10-minute quizzes will be given to the students throughout the semester. These quizzes will cover material discussed during the previous week of lectures. The quizzes will be used as bonus points (added to the exams' grades) to help the students with their grade.
- **Homework.** A homework at the end of each chapter will be assigned to the students . The homework will not be graded nor collected by the instructor. However, students are encouraged to do the homework and discuss their results with the instructor in order to better understand the course and be prepared for the exams.

### References

1. Fundamentals of Engineering Fluid Mechanics, by Gerhard, Gross, Addison- Wesley, Latest Edition.
2. Fluid Mechanics, by Douglas, Gasiorek, Swaffield, Pitman, Latest Edition.
3. Mechanics of Fluids, B.S Massey, Latest Edition.
4. Mechanics of Fluid, A.C.Walshaw and D.A.Jobson, Latest Edition

### Websites

- 1- <http://www.che.iitm.ac.in/~ch04d017/In/fm/>
- 2- <http://www.onesmartclick.com/engineering/fluid-mechanics.html>