Sichuan University - Pittsburgh Institute

Spring 2021

ME 1071: Applied Fluids

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class)

Instructor: Kin-Pang Cheong, Ph.D.
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Teaching Assistant: Gavin (Gengshuo Hu), 2017141521023@stu.scu.edu.cn
Office Hours: Mondays 4:00 pm – 5:00 pm

Lecture Times: Tuesdays 1:50pm-4:25pm, Liberal Arts building Zone 3, Room 306

Catalog Description: 3 Credits; this course is an advanced mechanical engineering approach to the study of fluid flow and fluid systems. Topics covered will include internal and external flow conditions for system design and implementation, open channel flow and compressible flow conditions. Students will also be introduced to CFD for Navier-Stokes solutions to fluid applications. *Prerequisites: ME 0071 Introduction to Fluid Mechanics.*

Required Text: Fox and McDonald's Introduction to Fluid Mechanics, 9th Edition, Pritchard. International Student Version

Course Objectives:

- Apply differential equation solutions to fluid in motion applications.
- Develop an advanced understanding of fluid motion and apply them to engineering applications.
- Applying fluid flow characteristics to internal and external flow conditions
- Understand problem solving techniques for Navier-Stokes equations.
- Understand compressible flow conditions and engineering applications of gas dynamics.
- Applying advanced fluid flow solution techniques to real world applications (i.e., CFD)

Course Outline:

- Internal Incompressible Viscous Flow (Ch. 8)
- External Incompressible Viscous Flow (Ch. 9)
- Compressible Flow (Ch.12)
- Computational Fluid Dynamics (Ch. 5)

Examination Schedule:

Exam I on Tuesday March 30th

Exam II on Tuesday May 11th

Final Exam on Tuesday June 29th

Exams will be during normal lecture time.

Course Grading:

Homework & In-class Quiz 30%

Exam I 20%

Exam II 20%

Final Exam 30%

Grading Scale: The official SCU/SCUPI grading scale will be used when determining final grades and numerical scores based on a student's course average. An additional curve may be applied, as determined by the overall final grade distribution of the class. Grades of A-, B+, B-, etc. will be determined at the instructor's discretion.

Class Policies: Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Exams will emphasize treatment of material covered in lectures. In general, no late assignments will be accepted or makeup exams given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend an exam or meet a due date, you must contact the instructor prior to the exam or due date. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor prior to the exam or assignment due date will result in a zero on that exam/assignment.)

Academic Integrity Policy: "Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation in oral or written form. Such violations will

be dealt with severely, in accordance with University policy. Plagiarism means representing someone else's idea or writing as if it were your own. If you use someone else's ideas or writing, be sure the source is clearly designated." It is expected that students adhere to the academic integrity policy that is presented in the Student's Honor Code of Conduct / Student Handbook.

Course Schedule:

Weeks	Dates	Lectures
1	Mar. 9	Course Introduction, Fluids Review
2	Mar. 16	Chapter 8: Internal Incompressible Viscous Flow
3	Mar. 23	Chapter 8: Internal Incompressible Viscous Flow
4	Mar. 30	Chapter 8/Exam I Review
5	Apr. 6	Exam I
6	Apr. 13	Chapter 9: External Incompressible Viscous Flow
7	Apr. 20	Chapter 9: External Incompressible Viscous Flow
8	Apr. 27	Chapter 9: External Incompressible Viscous Flow
9	May. 4	Chapter 11: Flow in Open Channels
10	May. 11	Chapter 11/Exam II Review
11	May. 18	Exam II
12	May. 25	Chapter 12: Introduction to Compressible Flow
13	Jun. 1	Chapter 12: Introduction to Compressible Flow
14	Jun. 8	Chapter 12: Introduction to Compressible Flow
15	Jun. 15	Chapter 5: CFD Related Topics
16	Jun. 22	Final Exam Review