

ME 1071: Applied Fluid Mechanics

(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: Richard C. Stehle, Ph.D.

Mechanical Engineering Faculty

Office: 4-219

Email: richardstehle@scu.edu.cn

Office Hours: Mondays from 1pm – 4pm and from Tuesdays 11am-1pm

Teaching Assistant: Jaclyn Zhou, 2016141521016@stu.scu.edu.cn

Office Hours: Mondays from 10:00am – 11:00am

Lecture Times:

Tuesdays 1:50pm-4:25pm, Room 3-106

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, fluid machinery, open channel flow and compressible flow conditions. Students will also be introduced to CFD for Navier-Stokes solutions to fluid applications. **Prerequisites: ME 0071**

Required Text:

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

Additional Text:

Fluid Mechanics Fundamentals and Applications, Cengel and Cimbala

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 potential flow and 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:**Part 1:**

Fluid Dynamics Review (Ch. 3-7)

Internal Incompressible Viscous Flow (Ch. 8)

Part 2:

External Incompressible Viscous Flow (Ch. 9)

Flow in Open Channels (Ch. 11)

Part 3:

Compressible Flow (Ch.12)

Special Topics/CFD

Examination Schedule:Exam I on Tuesday March 24thExam II on Tuesday May 5thFinal Exam on Tuesday June 23rd (tentative)

Exams will be during normal lecture time.

Course Grading:

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| Homework & Course Projects | 15% |
| In Class Studios | 15% |
| 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.

Course Schedule:

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| Week 1 | February 25 th Course Introduction, Fluids Review |
| Week 2 | March 3 rd Ch. 8 |
| Week 3 | March 10 th Ch. 8 |
| Week 4 | March 17 th Ch. 8/Test 1 review |
| Week 5 | March 24 th Test 1 |
| Week 6 | March 31 st Ch. 9 |
| Week 7 | April 7 th Ch. 9 |
| Week 8 | April 14 th Ch. 9 & Ch. 11 |
| Week 9 | April 21 st Ch. 11 |
| Week 10 | April 28 th Ch. 11/ Test 2 Review |
| Week 11 | May 5 th Test 2 |
| Week 12 | May 12 th Ch. 12 |
| Week 13 | May 19 th Ch. 12 |
| Week 14 | May 26 th Ch. 12 |
| Week 15 | June 2 nd Special Topics |
| Week 16 | June 9 th Final Exam Review |

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| Week 17 | June 16 th |
| | No Class/Reading Week |
| Week 18 | June 23 rd |
| | Final Exam |

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.