Wright State University
Department of Mechanical and Materials Engineering

Fall 2019

# ME 3350/5350: FLUID DYNAMICS

**Instructor:** Professor Scott K. Thomas, Ph.D., (937) 775-5142, Room 124 Russ Engineering Center
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**Course Homepage:** http://cecs.wright.edu/people/faculty/sthomas/fluiddynamics.html

**Class Hours:** MWF 11:15 a.m. to 12:10 p.m., Room 154 Russ Engineering Center

**Office Hours:** MWF 9:00 to 10:00 a.m., 3:30 to 4:30 p.m., or by appointment, Room 124 Russ Engineering Center

**Text:** Fox and McDonald's Introduction to Fluid Mechanics, Pritchard and Mitchell, Wiley.

**Problem Sets:** Use Handouts for the Problem Sets, which are due as indicated in the Course Schedule below. Each homework assignment will be submitted as a single PDF file using the Dropbox feature within Pilot. Late homework assignments will not be accepted by the Dropbox feature within Pilot or by the instructor.

**Homework Handouts:** http://cecs.wright.edu/people/faculty/sthomas/fluiddynamicshandouts.html

**Homework Solutions:** http://cecs.wright.edu/people/faculty/sthomas/fluiddynamicshomeworksolutions.html

**Mid-Term Exams:** Mid-term exams are scheduled as indicated in the Course Schedule below. Mid-term exams will not be rescheduled for any individual for any reason. If you miss a mid-term exam, the weight of that midterm exam will be placed onto the final exam. If you take a mid-term exam, you can choose to not have it graded. Simply take the bluebook with you as you exit the room. If you take your bluebook with you, the weight of that mid-term exam will be placed onto the final exam. If you submit a bluebook for me to grade, I will grade it, and you will receive the grade.

**Final Exam:** The final exam is scheduled as indicated in the Course Schedule below. The final exam will not be rescheduled for any individual for any reason. You cannot miss the final exam. If you miss the final exam, you will receive a FAILING GRADE for the class.

*Items that ARE allowed during mid-term exams and the final exam:*

- Bound textbook
- Calculator that does not have electronic communication capabilities
- Instructor-supplied paper
- Pen or pencil
- Eraser

*Items that ARE NOT allowed during mid-term exams and the final exam:*

- Cell phones or other electronic communication devices or methods
- The electronic version of the book
- Photocopies of the bound textbook
- Print-outs of the electronic version of the book
- Extra sheets of paper of any kind

I reserve the right to move any individual to another seat at any time during mid-term exams and the final exam.

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**Student Conduct During Mid-Term Exams and the Final Exam:**

- If you have a cellphone or other electronic communication device out during a mid-term exam, YOU WILL RECEIVE A ZERO FOR THE MID-TERM EXAM.
- If you decide to share your work with someone else during a mid-term exam, BOTH PEOPLE WILL RECEIVE ZEROES FOR THE MID-TERM EXAM.
- If you have a cellphone or other electronic communication device out during the final exam, YOU WILL RECEIVE A FAILING GRADE FOR THE CLASS.
- If you decide to share your work with someone else during the final exam, BOTH PEOPLE WILL RECEIVE A FAILING GRADE FOR THE CLASS.

Each type of incident outlined above will be referred to the Office of Community Standards and Student Conduct as a case of academic dishonesty.

**Academic Integrity Standards:**
http://www.wright.edu/community-standards-and-student-conduct/code-of-student-conduct/academic-integrity

**Course Grade:** 10% Problem Sets, 20% Mid-Term Exam 1, 20% Mid-Term Exam 2, 20% Mid-Term Exam 3, 30% Final Exam.

A: 100 to 90, B: 89 to 80, C: 79 to 70, D: 69 to 60, F: < 60

| Class Period | Date | Subject | Chapter | Homework Due Dates |
|---|---|---|---|---|
| 1 | 8/26 | Introduction | 1 | |
| 2 | 8/28 | Thermodynamics I Review | | |
| 3 | 8/30 | Fundamental Concepts | 2 | |
| 4 | 9/2 | **Labor Day Holiday, University Closed** | | |
| 5 | 9/4 | Fundamental Concepts | 2 | |
| 6 | 9/6 | Fundamental Concepts | 2 | |
| 7 | 9/9 | Fluid Statics | 3 | |
| 8 | 9/11 | Fluid Statics | 3 | |
| 9 | 9/13 | Fluid Statics | 3 | |
| 10 | 9/16 | Fluid Statics | 3 | |
| 11 | 9/18 | **Mid-Term Exam 1** | **1,2,3** | Chapters 1,2,3 |
| 12 | 9/20 | Basic Equations in Integral Form | 4 | |
| 13 | 9/23 | Basic Equations in Integral Form | 4 | |
| 14 | 9/25 | Basic Equations in Integral Form | 4 | |
| 15 | 9/27 | Basic Equations in Integral Form | 4 | |
| 16 | 9/30 | Basic Equations in Integral Form | 4 | |
| 17 | 10/2 | Basic Equations in Integral Form | 4 | |
| 18 | 10/4 | Basic Equations in Integral Form | 4 | |
| 19 | 10/7 | **Mid-Term Exam 2** | **4** | Chapter 4 |
| 20 | 10/9 | Introduction to Differential Analysis | 5 | |
| 21 | 10/11 | Introduction to Differential Analysis | 5 | |
| 22 | 10/14 | Incompressible Inviscid Flow | 6 | |
| 23 | 10/16 | Incompressible Inviscid Flow | 6 | |
| 24 | 10/18 | Incompressible Inviscid Flow | 6 | |
| 25 | 10/21 | Incompressible Inviscid Flow | 6 | |
| 26 | 10/23 | Dimensional Analysis and Similitude | 7 | |
| 27 | 10/25 | Dimensional Analysis and Similitude | 7 | |
| 28 | 10/28 | Dimensional Analysis and Similitude | 7 | |
| 29 | 10/30 | **Mid-Term Exam 3** | **5,6,7** | Chapters 5,6,7 |
| 30 | 11/1 | Internal Incompressible Viscous Flow | 8 | |
| 31 | 11/4 | Internal Incompressible Viscous Flow | 8 | |
| 32 | 11/6 | Internal Incompressible Viscous Flow | 8 | |
| 33 | 11/8 | Internal Incompressible Viscous Flow | 8 | |
| 34 | 11/11 | **Veterans Day, University Closed** | | |
| 35 | 11/13 | Internal Incompressible Viscous Flow | 8 | |
| 36 | 11/15 | Internal Incompressible Viscous Flow | 8 | |
| 37 | 11/18 | Internal Incompressible Viscous Flow | 8 | |
| 38 | 11/20 | External Incompressible Viscous Flow | 9 | |
| 39 | 11/22 | External Incompressible Viscous Flow | 9 | |
| 40 | 11/25 | External Incompressible Viscous Flow | 9 | |
| 41 | 11/27 | **Thanksgiving Holiday, University Closed** | | |
| 42 | 11/29 | **Thanksgiving Holiday, University Closed** | | |
| 43 | 12/2 | External Incompressible Viscous Flow | 9 | |
| 44 | 12/4 | External Incompressible Viscous Flow | 9 | |
| 45 | 12/6 | External Incompressible Viscous Flow | 9 | |
| 46 | 12/13 | **Final Exam: 10:15 a.m. to 12:15 p.m.** | **ALL** | Chapters 8,9 |