

Miami University
School of Engineering and Applied Science
Department of Engineering Technology

ENT 310
Course Number

FLUID MECHANICS
Title

3
Credit Hours

DESCRIPTION: The course emphasizes the application of fluid statics and fluid dynamics computational methods in the analysis of fundamental engineering fluid mechanics problems. The one-dimensional energy and momentum equations are introduced and used in the analysis of various types of practical fluid flow problems.

PERIODS PER WEEK : 2 lecture, 1 laboratory

PREREQUISITE(S): ENT 271, MTH 151

CO-REQUISITE(S): None

TEXT: *Applied Fluid Mechanics*, Mott Robert, Prentice Hall, 2000

METHOD OF PRESENTATION: Class room lectures and recitation periods will be presented. In-class tests, laboratory projects, home work portfolio of analysis and design projects will be assigned.

METHOD OF EVALUATION:

The following is the distribution of credit for the required tasks:

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|---------------------|-----|
| Portfolio – | 25% |
| Two Tests – | 50% |
| Final Examination – | 25% |

OBJECTIVES:

Upon completion of the course, students will have a basic understanding of :

- 1) the application of fluid statics to the solution of simple fluid mechanics analysis problems.
- 2) the application of conservation of mass, energy, and momentum equation to the solution of simple fluid mechanics analysis problems.
- 3) fluid measurement techniques

The student will demonstrate his/her understanding of these basic concepts by the level of performance on written homework, laboratory projects, tests, and examinations.

COURSE ASSESSMENT CRITERIA:

Outcome 7 “Fundamental knowledge of fluid mechanics concepts used in the design of fluid and mechanical systems”

Outcome 11 “Effective team work skills”

Outcome 13 “Fundamental knowledge of instrumentation used to measure parameters in fluid mechanics, heat transfer, and mechanical vibrations”

ASSESSMENT TOOLS:

Student Evaluations

Lab Assignments and Projects

Tests

Examinations

Employer Surveys

Graduate Surveys

TOPICAL OUTLINE:

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| Week 1 | The Nature of Fluids and Viscosity of Fluids | Chapters 1,2 |
| Week 2 | Pressure Measurements | Chapter 3 |
| Week 3 | Forces on Submerged Surfaces | Chapter 4 |
| Week 4 | Buoyancy and Stability | Chapter 5 |
| Week 5 | Test 1 and On-Site Laboratory Session I – Fluid Properties and Static Pressure | |
| Week 6 | Flow of Fluids and Bernoulli's Equation | Chapter 6 |
| Week 7 | General Energy Equation | Chapter 7 |
| Week 8 | General Energy Equation | Chapter 7 |
| Week 9 | Reynolds Number, Laminar and Turbulent Flow | Chapter 8 |
| Week 10 | Test 2 and On Site Laboratory Session II – Viscosity and Hydrostatic Forces | |
| Week 11 | Energy Loss Due to Friction | Chapter 9 |
| Week 12 | Minor Losses and Flow Measurement | Chapters 10 |
| Week 13 | Minor Losses and Flow Measurement | Chapters 10 |
| Week 14 | Forces Due to Fluids in Motion | Chapter 16 |
| Week 15 | Drag and Lift and On-Site Laboratory Session III – Minor Losses and Wind Tunnel Demonstration of measurement of Drag and Lift forces | Chapter 17 |
| Week 16 | Final Examination | |

MIAMI UNIVERSITY LEARNING COMMUNITY:

Miami University is committed to fostering a supportive learning environment for all students irrespective of individual differences in gender, race, national origin, religion, handicapping conditions, sexual preferences, or age. Students should expect, and help create, a learning environment free from all prejudice. Disparaging comments, sexist or racist humor, or questioning the academic commitment of students based upon these individual differences are behaviors that undermine our learning community. If such behaviors occur in class, please seek the assistance of your instructor or department chair.

Students with disabilities are encouraged to register with the Disability Service Office in order that academic accommodations may be made.

Revised by: Professor Ron Earley, July 18, 2008