**DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING**
**MECHANICAL ENGINEERING PROGRAM, BSC.**

# Course Syllabus

1. **Course number and name**
   ME 341 Fluid Mechanics 1

2. **Credits and contact hours**
   (3+0) 3 credit hours, 3 contact hours

3. **Course type**
   Face to face Learning Course (3+0)

4. **Instructor's or course coordinator's name**
   Eng. Dia' A. Afaneh

5. **Textbook information**
   Yunus A. Cengel Dr., John M. Cimbala - Fluid Mechanics_ Fundamentals and Applications-McGraw-Hill Education (2017), (4th Edition).
   ISBN: 978-1-259-01122-1

   a. **Other supplemental materials**
   - Frank M. White, Fluid Mechanics in SI units, 8th edition. 2016: McGraw-Hill.
   - Instructor's Notes

6. **Specific course information**
   a. **Catalog description**
   Properties of fluids, pressure and fluid statics, conservation laws, Bernoulli's equation, momentum and energy principles, dimensional analysis and similarity, and flow in pipes.

   b. **Prerequisites or co-requisites**
   Prerequisite: CEE 203 Advanced Engineering Math I

   c. **The course is:**
   Required in Mechanical Engineering Department.

7. **Specific goals for the course**
   a. **Course outcomes:**
   After completion of the course, students are expected to be able to:

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1. Discuss the phases of matter and the numerous ways of classification of fluid flow.
2. Discuss viscosity and surface tension and determine the capillary rise from static equilibrium conditions.
3. Discuss the absolute and gage pressure, the variation of pressure with depth, the manometer and barometer.
4. Discover how Newton's second law of motion can be applied to a body of fluid in motion and discuss the buoyant force applied by fluids on submerged or floating bodies.
5. Examine the characteristics of flow inside pipes and introduce the pressure drop correlations associated with it for both laminar and turbulent flows.

**b. The following student outcomes are addressed by the course:**

SO-(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

SO-(e) an ability to identify, formulate, and solve engineering problems.

SO-(pc-2) prepare students to work professionally in thermal systems.

**8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:**

| Learning Outcomes | Program PEOs | Method of Delivery | Assessment Method |
|---|---|---|---|
| **Course Outcomes** | | | |
| Discuss the phases of matter and the numerous ways of classification of fluid flow. | - | Lectures (Example and Problems) | Question in exam |
| Discuss viscosity and surface tension and determine the capillary rise from static equilibrium conditions. | - | Lectures (Example and Problems) | Question in exam |
| Discuss the absolute and gage pressure, the variation of pressure with depth, the manometer and barometer. | | Lectures (Example and Problems) | Question in exam |

| | | | |
|---|---|---|---|
| Discover how Newton's second law of motion can be applied to a body of fluid in motion and discuss the buoyant force applied by fluids on submerged or floating bodies. | - | Lectures (Example and Problems) | Question in exam |
| Examine the characteristics of flow inside pipes and introduce the pressure drop correlations associated with it for both laminar and turbulent flows. | - | Lectures (Example and Problems) | Question in exam |
| **Student Outcomes** | | | |
| SO-(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability | | | |
| SO-(e) an ability to identify, formulate, and solve engineering problems. | | | |
| SO-(pc-2) prepare | | | |

## 9. Weekly Teaching Plan

| Week No. | Lecture | Topic | Method of Delivery |
|---|---|---|---|
| 1 | Sun (9-10) | Chapter 1: INTRODUCTION AND BASIC CONCEPTS | Lecture |
| | Tue (9-10) | Chapter 1: INTRODUCTION AND BASIC CONCEPTS | Lecture |
| | Thu (9-10) | Chapter 1: INTRODUCTION AND BASIC CONCEPTS | Lecture |
| 2 | Sun (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |
| | Tue (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |
| | Thu (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |
| 3 | Sun (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |
| | Tue (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |

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|---|---|---|---|
| | Thu (9-10) | Chapter 2: PROPERTIES OF FLUIDS | Lecture |
| 4 | Sun (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Tue (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Thu (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| 5 | Sun (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Tue (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Thu (9-10) | First Exam | Exam |
| 6 | Sun (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Tue (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| | Thu (9-10) | Chapter 3: PRESSURE AND FLUID STATICS | Lecture |
| 7 | Sun (9-10) | Chapter 4: FLUID KINEMATICS | Lecture |
| | Tue (9-10) | Chapter 4: FLUID KINEMATICS | Lecture |
| | Thu (9-10) | Chapter 4: FLUID KINEMATICS | Lecture |
| 8 | Sun (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Tue (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Thu (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| 9 | Sun (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Tue (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Thu (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| 10 | Sun (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Tue (9-10) | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |
| | Thu | Chapter 5: BERNOULLI AND ENERGY EQUATIONS | Lecture |

| | | | |
|---|---|---|---|
| | (9-10) | | |
| 11 | Sun (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Tue (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Thu (9-10) | Second Exam | Exam |
| 12 | Sun (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Tue (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Thu (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| 13 | Sun (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Tue (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| | Thu (9-10) | Chapter 6: MOMENTUM ANALYSIS OF FLOW SYSTEMS | Lecture |
| 14 | Sun (9-10) | Chapter 8: INTERNAL FLOW | Lecture |
| | Tue (9-10) | Chapter 8: INTERNAL FLOW | Lecture |
| | Thu (9-10) | Chapter 8: INTERNAL FLOW | Lecture |
| 15 | Sun (9-10) | Chapter 8: INTERNAL FLOW | Lecture |
| | Tue (9-10) | Chapter 8: INTERNAL FLOW | Lecture |
| | Thu (9-10) | Chapter 8: INTERNAL FLOW | Lecture |

**10. Grade Distribution:**

| Assessment | Grade | Date |
|---|---|---|
| - First Exam | 20% | Fifth Week |
| - Second Exam | 20% | 10th Week |
| - Assignments | 10% | |
| - Final Examination | 50% | 16th Week |

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* Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.