1. Department, number, and title of course

Department of Civil Engineering, CENG 3310, Fluid Mechanics

2. Required Course

3. Course (catalog) description

Basic concepts of a fluid, and the fundamentals and applications of ideal and real fluid flow. Topics include fluid statics, conservation principles, the Bernoulli equation, fluid flow in pipes, pump and turbines, linear momentum, drag, similitude, fluid flow measurement devices, and open channel flow.

4. Co-requisite(s)

ENGR 2302, MATH 3305

5. Textbook(s) and/or other required material

Essentials of Fluid Mechanics: Fundamental and Application, John M. Cimbala and Yunus A. Cengel, McGraw-Hill, ISBN978-0-07-313835-0.

6. Course Objectives

1. Describe basic fluid properties.
2. Calculate static fluid pressure and forces on submerged bodies.
3. Use conservation of mass equations to solve engineering problems.
4. Apply Bernoulli's Equation for the calculation of flow parameters.
5. Calculate and use minor and major head losses in pipe flows.
6. Analyze fluid flow in pumping and turbine systems.
7. Use linear momentum to calculate external flow forces.
8. Use conservation and energy equations to determine open channel flow characteristics.

7. Topics Covered

- Fluid properties and forces.
- Conservation of mass.
- Flow parameters using Bernoulli's Equation.
- Fluid flow in pipes.
- Flow measurement.
- Pump and turbines.
- Linear momentum.
- Similitude.
- Drag.
- Open Channel Flow.

8. Class/laboratory schedule, i.e., number of sessions each week and duration of each session

LESSONS: 45@ 50 min (1 Att/wk) LABS: none

9. Contribution of course to meeting the requirements of Criterion 5

3.0 Credit Hours (ES=2.5, ED=0.5)

This is an engineering topics course that focuses on introducing fluid mechanics and how fluids behavior in various conditions.

10. Relationship of course to program outcomes

The course director's assessment of how this course contributes to the civil engineering program outcomes is listed below. The following scale is used:

1=No Contribution; 2=Small Contribution; 3=Average Contribution; 4=Large Contribution; 5=Very Large Contribution

CIVIL ENGINEERING PROGRAM OUTCOMES	Course Director Assessment
Program Outcomes Students who qualify for graduation with a civil engineering major will demonstrate:	
Can apply knowledge of traditional mathematics to solve problems	4
Can apply knowledge of traditional science (calculus-based physics, Chemistry, additional science) to solve problems	3
Can apply knowledge of traditional engineering skills to solve problems	4
Can use modern engineering tools to solve problems	3
Can design and conduct experiments, as well as analyze and interpret data in more than one civil engineering discipline	2
Can design systems, components, and processes	2
Can recognize the strengths and areas for possible improvement of their creative designs	2
Can work independently as well as part of a multidisciplinary design team	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of structural engineering	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of transportation engineering	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of construction management	1
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of hydrology and hydraulic design	5
Can identify, formulate, and solve engineering design problems using engineering models in the discipline of environmental engineering	1
Can analyze a situation and make appropriate professional decisions	3
Can analyze a situation and make appropriate ethical decisions	2
Have effective oral, written, and graphical communication skills	2
Demonstrate a commitment to learning and continued professional development outside the classroom	2
Incorporate contemporary issues during problem solving	3
Determine the impact of engineering solutions in a global and societal context	3
Can explain professional practice issues	3
Can explain leadership principles and attitudes	1
Can explain management concepts and processes	1
Can explain concepts of business practices	1
Can explain public policy and public administration	2

11. Person(s) who prepared this description and date of preparation

Dr. Peter Rogers, PE, Assistant Professor, 3 Nov 2008.