CIVE 502 Introduction to Fluid Mechanics – Fall 2013
[CIVE 502-001 (CRN 62555)] (Rev. August 13, 2013)

Catalog Description: Fundamental physical concepts of fluid mechanics; ideal and viscous flows; boundary-layer concepts.

Meeting Times: 9:00-9:50 am, MWF, Engineering Building, Rm. B105.

Instructor: Bogusz Bienkiewicz, Rm. A207B Engineering Building (Rm. A127 Engineering Research Center), 491-2026 (491-8232).

Textbook: Wilcox, D.C., <u>Basic Fluid Mechanics</u>, 5th Ed., 2012, DCW Industries, Inc., La Canada, CA (Reduced price has been negotiated with the publisher. For information how to order the textbook at a discounted price, students registered in the course should contact the course instructor).

Course Goals and Objectives: The course is designed for students interested in fundamental physical concepts of fluid mechanics, equations governing ideal and viscous fluid flows, and concepts of laminar and turbulent boundary-layer flows. Specific objectives of this course include:

1. To develop understanding of the physical principles governing the state and dynamic behavior of fluids at an intermediate level.
2. To develop analytic and mathematical skills appropriate to solve problems of fluid dynamics.
3. To relate the discussed principles and skills to practical engineering problems involving fluid dynamics phenomena

Course Topics/Weekly Schedule:

Week	Topics
1	Overview, Fluid Properties
2	Dimensional Analysis
3	Equations of Motion I
4	Equations of Motion II
5	Integral Analysis
6	Vorticity & Viscosity
7	Potential Flow
8	Computational Methods
9	Viscous Effects
10	Navier- Stokes Eq. & Solutions I
11	Navier-Stokes Solutions II
12	Boundary Layer & Turbulence
13	Turbulent Boundary Layer
14	Statistical Theory of Turbulence
15	Turbulence Models for CFD

Methods of Evaluation: Periodic homework problem sets will be assigned. Special design or paper review project will be assigned. Students will make a brief oral presentation on this assignment. Two equally weighted exams and a final (comprehensive) exam will be given. The course grade will be based on the following distribution: Homework problems - 25%; Exam I - 20%; Exam II - 20%; Design project/review paper - 5%; Final exam - 30%.