Course Information – Fall 2017

Class Section: MECH 3315.002.17F Course Title: Fluid Mechanics Class Level: Undergraduate Class Credits: 3 Credits Room: JO 4.614 Time: Monday and Wednesday 4:00pm-5:15pm Starts: August 21, 2017 Ends: December 14, 2017

Professor Contact Information

Prof. Giacomo Valerio Iungo Office: WSTC 2.208 Phone: 4621 Email: <u>valerio.iungo@utdallas.edu</u> Office hours: Wednesday 1:30-4:00 pm, or by appointment requested via email

Course prerequisites: MECH 2330 and ENGR 3300. Co-requisite: MECH 3310`

Course Description:

In this course we will study the physic governing the motion of fluids at an introductory level. We will familiarize with basic concepts in fluid mechanics, such as continuum, velocity field, and vorticity. We will apply the principle of the mass conservation and the Newton's law to describe the fluid motion and solve basic engineering problems. After studying simple cases of fluid motion for inviscid fluids, we will consider viscosity for internal flows (e.g. pipe flows), external flows (airfoils and bluff bodies), and flows with a free surface. Then dimensional analysis will be presented, which is very useful to understand the role of different parameters for complicated problems.

Course Learning Outcomes

- C1864: Derive the governing equations of fluid mechanics, and use the equations to reason about fluid flows.
- C1865: Explain the concept of control volume and apply it to solve fluid mechanics problems in inertial frames.
- C1866: Identify key non-dimensional parameters for given systems and use such numbers to characterize the systems.
- C1867: Explain the role of fluids in real life situations.

Suggested Textbooks and Materials

Lecture slides will be provided by the instructor. The suggested textbook is the following:

- Primary: R.W. Fox & A.T. McDonald's, Introduction to Fluid Mechanics 9th or 8th Edition, P.J. Pritchard, John Wiley, New York, 2009, ISBN 13: 978-0470547557.
- Secondary: G. Buresti. Elements of Fluid Dynamics. Imperial College Press Fluid

Assignments & Academic Calendar

Numbers in brackets represent chapter in Fox's book

Week 1	Fundamental concepts (2)
Week 2	Fluid statics (3)
Week 3	Basic equations in integral form (4)
Week 4	Fluid motion: differential approach (5)
Week 5	Inviscid flow (6)
Week 6	Review on W1-W5
Week 7	Inviscid flow (6)
Week 8	Newtonian flow – internal flow (8)
Week 9	Newtonian flow – internal flow (8)
Week 10	Newtonian flow – external flow (9)
Week 11	Newtonian flow – external flow (9)
Week 12	Review on W6-W11
Week 13	Newtonian flow – flow with free surfaces (11)
Week 14	Dimensional analysis (7)
Week 15-16	Advanced problems (12, 13), Final

Grading Policy

Pop Quizzes	20%
Test 1	20%
Test 2	20%
Homework/Project	10%
Final (Comprehensive)	30%

Policies and Procedures for Students

The University of Texas at Dallas provides a number of policies and procedures designed to provide students with a safe and supportive learning environment. Brief summaries of the policies and procedures are provided for you at

<u>http://go.utdallas.edu/syllabus-policies</u> and include information about technical support, field trip policies, off-campus activities, student conduct and discipline, academic integrity, copyright infringement, email use, withdrawal from class, student grievance procedures, incomplete grades, access to Disability Services, and religious holydays.