THE UNIVERSITY OF TEXAS – PAN AMERICAN
College of Engineering and Computer Science
Department of Mechanical Engineering

MECE 3315-02 Fluid Mechanics - Fall 2014 - Course Syllabus

Instructor	Dr. Javier Ortega
Office/Phone	ACSB 1.205 / (956) 665-2050
Email	ortegaja@utpa.edu
Class Schedule	MW 1:10pm – 2:25pm, ENGR. 1.236
Office Hours	MWF: 11:00 am – 12:00 pm, or by appointment
Website	http://ortagaja-utpa.weebly.com

Course Prerequisites

Thermodynamics (MECE 2335) and Engineering Analysis II (MECE 3450).

Textbook

Fox and McDonald's Introduction to Fluid Mechanics, P. J. Pritchard, 8th Edition, (Wiley), 2011. [ISBN-10: 0470547553], [ISBN-13: 978-0470-54755-7]

Course Description

This course offers engineering students an in-depth look into the following topics: laws and theory relative to incompressible fluids, continuity, momentum and energy relations; internal and external flow in laminar and turbulent regimes design of piping systems and aircraft parameters.

Course Objectives:

At the end of the course the students will gain the:

- Knowledge of physical quantities pertinent to fluid flow, examples include hydrostatic pressure, friction, momentum, drag coefficient, etc…
- Ability to apply fundamental laws in control volume form to engineering applications.
- Knowledge of experimental results on the flow of fluids in pipes and around objects.
- Ability to apply basic laws of fluid mechanics to compute various parameters.

Grading Policy

Quizzes	10 %
Homework	15 %
Binder	5%
Midterm exams	40 %
Final exam	30 %

The following grading criteria will be used

Grade	Percentage
A	90 - 100
B	80-89
C	70 -79
D	60-69
F	< 60

Homework
Homework will be assigned every class. You must turn in your own homework at the beginning of the class. **Late homework will not be accepted**. Work should be written following the same format studied in class that includes:
   a) Statement of the problem
   b) Provide a schematic diagram of the problem
   c) Solve the problem using your work in detail by stating your assumptions and providing the equations you used and the numerical values you obtained.
   d) Highlight answers with **proper units** and discuss your findings.
Failure to follow the four steps mentioned above will result in point deducted from your homework assignment.

Quizzes
   To ensure that students do their own work, one of the homework problems will be chosen for a ten minute quiz that will be administered at the beginning of each class period. Students may pick up the quiz as you enter class after turning in your homework assignment. All materials except a pencil and non-programmable calculator must be kept on the floor until the quiz is collected. **No makeup quizzes will be given**. If you have an excused absence you will be given a grade equal to your current quiz average.

Midterm and Final Exams
   All exams will be closed book and closed notes. A formula sheet and appropriate tables may be provided.

MECE 3315 – Fluid Mechanics

CHAPTER	TOPIC	SECTIONS COVERED
1	Introduction	All
2	Fundamental Concepts	All
3	Fluid Statics	All except 3.7
4	Basic Equations in Integral Form for Control Volume	All except 4.6 and 4.7
	EXAM 1	
5	Introduction to Differential Analysis of Fluid Motion	All except 5.5
6	Incompressible Inviscid Flow	All except 6.6 and 6.7
7	Dimensional Analysis and Similitude	All
	EXAM 2	
8	Internal Incompressible Viscous Flow	All
9	External Incompressible Viscous Flow	All
	FINAL EXAM	

Fluid Mechanics Course Objectives and Outcomes

Course Outcomes and Assessment:

At the conclusion of this course, students will be able to:

1. Understand the fundamental concepts of velocity field, stress field, and viscosity (H, Q, T).
2. Apply the basic equations of fluid statics to manometers and hydraulic systems (H, Q, T).
3. Determine the hydraulic force submerged surfaces (H, Q, T).
4. Apply the basic equations in integral form for a control volume (H, Q, T).
5. Understand the differential analysis of fluid motion (H, Q, T).
6. Apply the dimensional analysis and similitude (H, Q, T).
7. Understand the fundamentals of internal and external incompressible viscous flow (H, Q, T).

Key: H - Homework, Q - Quiz, T – Test

Mechanical Engineering Department Classroom Policies

Attendance
1. Attendance will be taken every time the class meets. Any student arriving to class **5 minutes** after the class has started will not be allowed in class. Students will be allowed a **maximum** of 5 absences for the whole semester for classes meeting three times a week, 3 absences for classes meeting twice a week, and 2 absences for classes meeting once a week. A **point** will be deducted from the total (100%) for each **unexcused** absence exceeding the maximum allowable.
2. Students **will not** be permitted to leave the classroom during lectures and exams except for **extreme emergencies**.

Homework and Exams
1. **Absolutely** no assignments will be accepted late.
2. Make-ups for in-class exams for **extreme emergencies** will be scheduled at the end of the semester.

Plagiarism
Any instance of cheating or plagiarism will result in **loss of credit** for the work, and will be reported to the Chair of the ME Department and/or the Dean of Students for appropriate action which may include **loss of credit** for the course or **dismissal** from the University.

Drop Policy
Students can withdraw from a course through the *Office of Records and Registration* on or prior to:
- September 10, 2014, Wednesday: Twelfth class day (Census date), courses dropped by this date do not count toward six course drop limit.
- September 23, 2014, Tuesday: Last day to change course to non-credit.

American Disabilities Act Statement
Students with disabilities are encouraged to contact the Disability Services office for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Texas-Pan American to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Disability Services office (DS), University Center #108, 665-7005 or disabilityservices@utpa.edu.

Mandatory Course Evaluation Period (November 12th – December 3rd)
Students are required to complete an *ONLINE* evaluation of this course, accessed through your UTPA account (https://my.utpa.edu/); you will be contacted through email with further instructions on the evaluation process. The evaluation window closes at 11:59 pm on Dec. 3rd, the last day of classes for the spring semester. Students who complete their evaluations by Dec. 3rd will have priority access to their grades.

Mechanical Engineering Program Educational Objectives

The Educational Objectives of the Mechanical Engineering Program at The University of Texas - Pan American are to produce graduates who:
1. have the knowledge and technical skills required to be and to remain productive in the field of mechanical engineering.
2. have an understanding of the importance of professionalism, ethics, safety and socioeconomics concerns in resolving technical problems.
3. are capable of functioning in diverse environments.

Educational Outcomes (Engineering Programs)
It will be demonstrated that the student:
1. **is able to use knowledge of mathematics, basic sciences and engineering to analyze (identify, formulate, and solve) problems in mechanical engineering.**
2. is able to design and conduct experiments and interpret results.
3. is able to design mechanical devices, systems or processes that meet given specifications.
4. is able to function in multi-disciplinary teams.
5. **is able to communicate ideas effectively in graphical, oral, and in written media.**
6. **understands the professional responsibility of an engineer and how engineering solution impacts safety, economics, ethics, politics, societal, cultural and contemporary issues.**
7. **understands the need for lifelong learning to keep abreast of current practice.**
8. Is able to use state of the art computational hardware and software for analysis, design and documentation (techniques, skills, and modern engineering tools necessary for engineering practice.

Fundamentals in Science and Mathematics (Mechanical Engineering)
It will be demonstrated that the student:
1. **has knowledge of chemistry and calculus-based physics with depth in at least one.**
2. **has the ability to apply advanced mathematics to problems involving thermal and mechanical systems.**
3. has the ability to apply statistics and linear algebra to problems involving thermal and mechanical systems.

Fundamentals in Engineering
It will be demonstrated that the student:
1. has the ability to create and annotate two-dimensional drawings, and generate three-dimensional computer based on solid models of mechanical components.
2. **has the ability to design and analyze components and systems for mechanical and energy performance.**
3. has the ability to specify and evaluate materials and manufacturing steps for mechanical components.
4. has the ability to conceive and conduct experiments to measure the performance of materials, components and systems, and to communicate the results.
5. has the ability to acquire new skills and specialized knowledge from published sources.

ACKNOWLEDGEMENT OF RECEIPT OF SYLLABUS

By signing below, I hereby affirm that I have received a copy of the syllabus for **MECE 3315 Fluid Mechanics** and have been informed by the **Instructor** that it is my responsibility to **carefully** read and understand this document and abide by all its content. I also agree to prepare and submit to the **Instructor**, at the end of the semester, a folder that contains **all** my homework assignments, quizzes, exams, projects, reports and/or literature review (if applicable).

_____
Student ID Number

_____
Printed Name

_____
Signature

_____
Date