Philadelphia University
Faculty of Engineering
Mechanical Engineering Department
First semester, 2010/2011

Course Syllabus

Course Title: Fluid Mechanics (2)	**Course code: 620431**
Course Level: 5	**Course prerequisite : *Fluid Mechanics (1) (620331)***
Lecture Time:08:15-09:30 (Mon, Wed)	**Credit hours: 3**

Academic Staff Specifics

Name	Rank	Office Location and Number	Office Hours	E-mail Address
Dr. Munzer Ebaid	**Assistant Professor**	**Mechanical Eng Building, E61312**	**(11.10-12:10) Tuesday (09.10-10.10) Thursday**	**mebaid@philadelphia.edu.jo**

Course description

To make the students develop and enhance the knowledge and awareness of fluid mechanics and its applications in practice. The students will learn to link the concepts of surface resistance to fluid flow in internal and external flows, drag and lift forces imposed on immersed bodies in a flowing fluid, and the effect of density variation on the flow properties due to its high speed (compressible flow). Also, the students will learn about the various instruments used for the measurements of velocity, pressure and flow rate, turbo-machines concepts that include the study characteristics of propellers, axial and radial pumps, fans and turbines, and the varied flow in open channels to their everyday world and previously learned concepts. However, the students should have background knowledge in statics, calculus, and basic fluid mechanics.

Course objectives

Upon completion of this course the student should be able to understand the following:

- Laminar and turbulent flow boundary layers over flat plates.
- Laminar and turbulent flow in conduits.
- Drag and lift forces on immersed bodies.
- Compressible flow and shock waves.
- Flow measurements.

- Turbomachinery.
- Varied flow in open channels.

Course components

- ***Books (title , author (s), publisher, year of publication)***
  Engineering Fluid Mechanics, 8th edition, C.T. Crowe, D.F. Elger, and J.A. Roberson, John Wiley & Sons, Inc. 2005.
- ***Support material (s)***
  Collected notes from different sources.
- ***Study guide***
  Lectures and solving problems and home works in classroom.

Teaching methods

Lectures, discussion groups, tutorials, and problem solving,

Learning outcomes

- ***Knowledge and understanding***
  Extending the student's knowledge of concepts of fluid mechanics and its application in practice, and learning the analysis and problem solving pertinent to the mechanics of fluid flow.
- ***Cognitive skills (thinking and analysis)***
  The students should link the scientific concepts they are learning with real applications by giving live examples where the subject concepts are applied.
- ***Communication skills (personal and academic)***
  Students gain a lot of information by searching through the internet and references and from local firms in order to solve problems relevant to this course.
- ***Practical and subject specific skills (Transferable Skills)***
  The knowledge of fluid mechanics is of practical importance for engineers who wish to be specialized in thermo-fluid sciences and is of importance also for industry and other advanced courses.

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects.
- Quizzes.
- Assignments.
- Final examination: 50 marks

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**15**
Second examination	**15**
Final examination: 50 marks	**50**
Reports- projects- Quizzes- Homework	**20**

Total	**100**

Documentation and academic honesty

- ***Documentation style (with illustrative examples)***
  The students will be given the key solution after each exam to compare with their answers. If any student has a query then the supervisor should consider it based on the key solution and the marking scheme.

- ***Avoiding plagiarism.***
  The university has strict rules about plagiarism, and it will be put into effect where it is seen to be necessary.

Course/ academic calendar

- Laminar and turbulent flow boundary layers over flat plates.
- Laminar and turbulent flow in conduits.
- Drag and lift forces on immersed bodies.
- Compressible flow and shock waves.
- Flow measurements.
- Varied flow in open channels.

Week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Surface resistance (laminar boundary layers)	**Quiz at the end of the chapter and homework**
(2)	Surface resistance (turbulent boundary layers)	
(3)	Flow in conduits (laminar flow in pipes)	**Quiz at the end of the chapter and homework**
(4)	Flow in conduits (turbulent flow in pipes)	
(5)	Drag and lift forces	
(6)	**First examination**	
(6+7)	Drag and lift forces	**Quiz at the end of the chapter and homework**
(8)	Compressible flow	**Quiz at the end of the chapter and homework**
(9)	Compressible flow	
(10)	Compressible flow	
(11)	**Second examination**	
(11)	Flow measurements	**Quiz at the end of the**

(12)	Flow measurements	**chapter**
(13)	Turbomachinery	**Quiz at the end of the chapter and homework**
(14)	Turbomachinery	
(15)	Varied flow in open channels	**Quiz at the end of the chapter and homework**
(16)	Varied flow in open channels	
(16)	**Final Examination**	

Expected workload

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

References

Books

1. “Engineering Fluid Mechanics”, by C.T. Crowe, D.F. Elger, and J.A. Roberson, John Wiley & Sons, Inc.
2. "Introduction to Fluid Mechanics", by R. Fox & A. McDonald, Wiley.
3. "Fluid mechanics with engineering applications", by R. Daugherty, J. Franzini and E. Finnmore, McGraw-Hill.
4. "Fluid Mechanics", by F. White, McGraw-Hill.
5. "Fluid Mechanics", by P. Kundu, Academic Press.
6. "Mechanics of Fluids", by I. Shames, McGraw-Hill.
7. "Mechanics of Fluids", by M. Potter & D. Wiggert, Prentice-Hall.
8. "Fundamentals of Fluid Mechanics", by P. Gerhart, R. Gross & J. Hochstein, Addison Wesley.
9. "Elementary Fluid Mechanics" by J. Vennard & R. Street, Wiley.
10. "Mechanics of Fluids", by B.S.Massey.
11. "Fundamentals of Fluid Mechanics", by, B.R. Munson, D.F. Young & T.H. Okiishi, , John Wiley & Sons.