The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Fluid Mechanics I	0904361	

2019 Course Catalog Description

Introduction, Fluid properties, Basic units. Fluid statics, Pressure and its measurements, Forces on plane and curved submerged surfaces, buoyancy & stability, Fluids in motion, Flow kinematics and visualization, Basic control volume approach, Differential and integral continuity equation. Pressure variation in flowing fluids, Euler's and Bernoulli's equations, Applications of Bernoulli equation. Momentum equation and its applications, Energy equation, Hydraulic and energy grade lines. Dimensional analysis and similitude. Flow in conduits, laminar and turbulent flows, Frictional and minor losses, Piping systems, Pumps, Concept of Hydraulic jump.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title	Engineering Fluid Mechanics	
Author(s)	Elger, D. F., Williams, B. C, Crowe, C. T., and Roberson, J. A.	
Publisher, Year, Edition	John Wiley and Sons., 2014, 10th edition,(SI units)	

References

Books	Bruce R. Munson, Donald F. Young and Theodore H. Okiishi (1994) Fundamentals of Fluid Mechanics, (2nd Edition). John Wiley and Sons.
Journals	
Internet links	National Committee on Fluid Mechanics Films http://www.mit.edu/hml/ncfmf.html

Prerequisites

Prerequisites by topic	-
Prerequisites by course	Engineering math. (2) 033130 + Dynamics 0904222
Co-requisites by course	-
Prerequisite for	1. Fluid mechanics lab 2. Fluid mechanics (2) 3. Heat transfer (1) 4. Engineering Measurements 5. Design of Hydraulic and Pneumatic Systems 6. Design of sanitary systems 7. Turbomachinery 8. Introduction to Flight Mechanics

Topics Covered

Week	Topics	Chapter in Text	Sections
1, 2	Fluid properties	Chapters 1&2	1.1 ,1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10

3, 4, 5	Fluid statics	Chapter 3	3.1, 3.2, 3.3, 3.4, 3.5, 3.6. 3.7
6, 7	Flowing fluids and pressure variation	Chapter 4	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11
8	Control volume approach and Continuity equation	Chapter 5	5.1, 5.2, 5.3, 5.4, 5.5
9	Momentum equation	Chapter 6	6.1, 6.2, 6.3, 6.4, 6.6
10	Energy Equation	Chapter 7	7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8
11	Dimensional analysis and similitude	Chapter 8	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7
12-15	Flow in conduits	Chapter 10	10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Ability to analyze hydrostatic loading problems 2. Study flowing fluids and pressure variation 3. Understanding the analytical and empirical formulations for flows in conduits and calculate losses in pipe systems 4. Applications of mass, momentum and energy conservation laws to fluid mechanics problems 5. Applications of dimensional analysis and dynamic similitude to fluid mechanics problems

Evaluation

Assessment Tools	Expected Due Date	Weight
Quizzes		25 %
Midterm Exam		25 %
Final Exam		50 %

Contribution of Course to Meet the Professional Components

The course contributes to building the fundamental basic concepts of fluid statics and motion analysis and basic fluid mechanical piping systems design.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X						

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by ABET Committee, 2021