Academic Quality Assurance Department

Course Syllabus Form

College	College of Engineering and Technology		
Department	Department of Mechanical Engineering		
Program	Mechanical, Mechatronics, and Building Engineering		
Course Title	Fluid Mechanics and Thermal Lab.	**Course Number:**	12210341
Year	2024	**Semester:**	Summer
Prerequisite(s)	Thermodynamics (1), Heat transfer & Fluid Mechanics		
Instructor	Dr. Hafiz Daraghmeh		Office: H302
Instructor's e-mail	h.m.daraghmeh@ptuk.edu.ps		
Office Hours	Sun, Mon (12:00 ~ 1:00)		
Class Time	Sun, Mon (10:00 -12:00)	**Class Room:**	H005
Course description	This course aims to provide students with the principles and applications of fluid mechanics and heat transfer; the laboratory of fluid mechanics and heat transfer complements the learning experience of the lecture. Laboratory exercises provide opportunities for direct study of fluid behavior and heat transfer. All of the laboratory experiments reinforced material presented in lecture.		
Course Intended Learning Outcomes (CILOs)	1. Gain familiarity with physical manifestations of fluid mechanics and heat transfer. 2. Develop and reinforce measurement skills. 3. Develop and reinforce skills in documenting observations and report writing. 4. To directly study fluid behavior and heat transfer through the experiments.		
Textbook(s)	**1.** Fluid mechanics and thermal laboratory manual sheets.		
Other required material (References):	**1.** Fluid mechanics (fundamentals and applications), 3rd edition; Yunus A. Cengel and John M. Cimbala. **2.** Jack B. Evett and Cheng Liu, "Fundamental of Fluid Mechanics".		
Other Resources used (e.g. e-learning, field visits, periodicals, software, etc.)	https://en.wikipedia.org/wiki/Fluid_mechanics		

Course Teaching Methods	
Teaching Method	**CILOs**
First part of each class should be exploited for explaining the theoretical background regarding the experiment topic and the experimental apparatus. For the second part, teacher has to show student how to correctly use the apparatus then take the required data for making the report.	1. Gain familiarity with physical manifestations of fluid mechanics and heat transfer. 2. Develop and reinforce measurement skills. 3. Develop and reinforce skills in documenting observations and report writing. 4. To directly study fluid behavior and heat transfer through the experiments.

Assessment Type	Details/Explanation of assessment in relation to CILOs	Weight	Date(s)
Mid-term Exam	-To develop skills regarding fluid flow through flow measurement devices; such as venture meter, orifice meter, rotameter,.. etc. -To be familiar with pressure measurement techniques, types, measurement units, and to determine center of pressure on inclined planes.	30%	T.B.A
Reports and other activities	Analyze experiments' results and data configuration. Report must include; objectives of the experiment, theoretical background, apparatus and tools, procedure, results analysis, and conclusion.	30%	T.B.A
Final Exam	In addition to the mid-term material, skills regarding heat transfer will be added to the students' knowledge; such as thermal conductivity, linear and radial heat conduction.	40%	T.B.A
Total		100%	

Course Intended Learning Outcomes (CILOs)											
CILOs	**Mapping to Program ILOs**										
On successful completion of the course, students will be able to:	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**I**	**j**	**k**
Ability to design and conduct experiments and ability to analyze and interpret data		✓									

Ability to use tables, figures, and energy equations to predict pressure drop in pipes, across fittings.	✓										
Ability to calculate fluid pressure, center of pressure, and force on surface.	✓										
Ability to use techniques, skills and tools in engineering practice											✓
Ability to collect data from the thermal experiments, use it to determine the thermal conductivity and temperature gradient, and to compare them for deferent materials.		✓									

Course Weekly Breakdown					
Week	**Date**	**Topics Covered**	**CILOs**	**Lab Activities**	**Assessment**
1		Volumetric Hydraulic Bench.	a,b,k	Conduct an experiment	Report and activity
1		Calibration of a pressure gauge	a,b,k	Conduct an experiment	Report and activity
2		Pressure measurement bench	a,b,k	Conduct an experiment	Report and activity
2		Venturi meter	a,b,k	Conduct an experiment	Report and activity
3		Flow measurements (rotameter, orifice, elbow, ..etc)	a,b,k	Conduct an experiment	Report and activity
4		Center of pressure on plane surfaces	a,b,k	Conduct an experiment	Report and activity
		Midterm Exam	a,b,k	Exam	
5		Reynolds Number	a,b,k	Conduct an experiment	Report and activity
6		Thermal conductivity	a,b,k	Conduct an experiment	Report and activity
7		Linear heat conduction	a,b,k	Conduct an experiment	Report and activity
7		Radial heat conduction	a,b,k	Conduct an experiment	Report and activity
8		Final Exam	a,b,k	Exam	

Prepared by:	Dr.Hafiz Daraghmeh Eng. Othman Abd-Al-rahman	**Signature**	
Head of Department	Dr. Jafar Masri	**Signature**	
Date			