



Philadelphia University
Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title:	Heat transfer lab (620427)
Prerequisite:	Heat transfer 2 (620426)
Credit Hours:	1credit hours (3 hours/ week, 14 weeks per semester)
Textbook:	Lab manual ,lecture notes
References:	Principle of heat and mass transfer

Course Description:

- To provide students with the necessary skills to conduct experiments on conduction, and convection of heat; collect data, perform analysis and interpret results to draw valid conclusions through standard test procedures.
- To determine thermal properties and performance of radiation heat transfer, heat exchanger, condensation, boiling.

Course requirements: Computer, internet connection, webcam

Instructor: **Eng. Azad F. Otoum**
Office: Engineering building, Mechanical Department, room 6212, ext: 2252

Course Topics(Experiments):

Week	Experiments.
1	Marcet boiler
2	Thermal conductivity
3	Natural convection and radiation
4	Forced convection heat transfer
5	Film and drop-wise condensation
6	Heat exchanger 1 (parallel and counter flow)
7	Heat exchanger 2 (effect of flow rate variation)

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

Course Learning Outcomes and Relation to ABET Student Outcomes:

Up on successful completion of this course, a student should be able to:

1.	Understand some important concepts in heat transfer such as :(Boiler, Exchanger, Condensation, Conductivity, Convection, and Radiation).	[6]
2.	Develop and conduct appropriate experimentation on laboratory instruments and equipment to collect data. Ability to measure temperatures, thermal conductivity, velocity flow profile, and flow rate.	[6]
3.	Students must apply their technical writing skill to all design projects graduated projects and using engineering judgment to draw conclusions.	[6]
4.	Know the thermal and physical properties of material in relation to heat transfer and to understand the effect of temperature and pressure on those properties.	[6]
5.	Estimate heat transfer by forced convection in horizontal pipe.	[6]
6.	Ability to measure the quantity of heat transfer between fluids and solid boundaries, amount of heat exchanged between two fluids and amount of radiation heat transfer	[6]

Evaluation methods:

Evaluation of students' performance (final grade) will be based on the following categories:

Reports: Each experiment has a report describing abstract, introduction, procedure, readings, results, discussion and analysis, and conclusion.

Quizzes: Three quizzes will be given to the students during the semester. These quizzes will cover each three experiments in the lab. Fifteen minutes for each quiz.

Final Exam: The final exam will cover all the class material.

Grading policy:

Mid	30% (Reports, and Assignment)
Third	30% (Reports, and Quiz)
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes 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