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

Course Syllabus

Course Title: Thermodynamics (1)	**Course code: (620341)**
Course Level: 3	**Course prerequisite:** ***Engineering Math 210102***
Lecture Time: 11:15-12:30 (Mon, Wed)	**Credit hours: 3**

		Academic Staff Specifics		
Name	**Rank**	**Office Number and Location**	**Office Hours**	**E-mail Address**
Munzer Ebaid	**Assistant Prof.**	**Mechanical Eng Building, (E16312)**	**(10:15-11:15) (Mon, Wed)**	**ebaid@Philadelphia.edu.jo**

Course module description:
To make the students develop and enhance the knowledge and awareness of thermodynamics and its applications in practice. The students will learn the basic principles of thermodynamics, to present a wealth of real-world engineering examples to give students a feel for how thermodynamics is applied in engineering practice and finally to develop an intuitive understanding of thermodynamics by emphasizing the physics and physical arguments.

Course module objectives:
- Introduction of thermodynamic engineering applications.
- Familiarization with the thermodynamic terminology.
- Introduction of several properties that can be used to quantitatively describe a thermodynamic system. These properties include: pressure, temperature, specific volume, internal energy, enthalpy, entropy, etc.
- Studying several important thermodynamic quantities such as energy, work, and heat.
- Studying the basic laws of thermodynamics.
- Introduction of the basic ideas behind heat engines and refrigerators.
- Developing the skills needed to perform thermodynamic analysis for several types of basic thermodynamic systems.

Course/ module components

- ***Books (title , author (s), publisher, year of publication)***

  Thermodynamics, An Engineering Approach, Yunus A. Cengel and Micheal A. Boles 6^{th} Edition.

- ***Support material (s)***
  Heat Transfer, J.P. Holman, S.I. Metric edition, Mc-Graw Hill, Latest Edition**.**
  Collected notes from different sources.

- ***Study guide***
  Lectures and solving problems in classroom and solving home works.

- ***Homework and laboratory guide (s) if (applicable).***
  Marcet boiler, natural convection and thermal radiation, forced convection heat exchanger, film & drop wise condensation, air conditioning (heat pump & air cooler) and bomb calorimeter

Teaching methods:
Lectures, discussion groups, tutorials, and problem solving,

Learning outcomes:

- ***Knowledge and understanding***
  Extending the student's knowledge of concepts of thermodynamics and its application in practice, and learning the analysis and problem solving pertinent to thermal systems.
- ***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 thermal sciences is of practical importance for engineers who wish to be specialized in thermal systems in industry. The subject is importance for other advanced courses.

Assessment instruments

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

Allocation of Marks	
Assessment Instruments	**Mark**
Midterm examination	**15%**
Second examination	**15%**
Final examination: 50 marks	**50%**
Reports, research projects, Quizzes, Home works, Projects	**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/module academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction and Basic Concepts of Thermodynamics	**Quiz and homework at the end of the chapter**
(2)	Introduction and Basic Concepts of Thermodynamics	
(3)	Energy Transfer and General Energy Analysis	**Quiz and homework at the end of the chapter**
(4)	Energy Transfer and General Energy Analysis	
(5)	Properties of Pure Substance.	
(6)	**First Exam**	
(6)	Properties of Pure Substance.	**Quiz and homework at the end of the chapter**
(7)	Energy analysis of a closed system.	**Quiz and homework at the end of the chapter**
(8)	Energy analysis of a closed system.	
(9)	Energy analysis of a closed system.	**Chapter 4 65,75,84,90**
(10)	Mass and energy analysis of control volumes	
(11)	**Second Exam**	
(11+12)	Mass and energy analysis of control volumes	**Quiz and homework at the end of the chapter**
(13)	The second law of thermodynamics.	**Quiz and homework at the end of the chapter**
(14)	The second law of thermodynamics.	
(15) **(16)**	Entropy	**Quiz and homework at the end of the chapter**
(16)	**Final Exam**	

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.

Module references

Books

- **F**undamentals of Engineering thermodynamics, Moran and Shapiro 2005.
- Heat Transfer, J.P. Holman, S.I. Metric edition, Mc-Graw Hill,Latest Edition.
- Heat Transfer, Martin Becker, Plenum Press, Latest Edition.