



Philadelphia University
Faculty of Engineering
Department of Mechanical Engineering
Second semester, 2008/2009

Course Syllabus

Course Title: Internal Combustion Engines	Course code: 620541
Course Level: 5th year	Course prerequisite (s) and/or co requisite (s): Thermodynamics II, 620342
Lecture Time: 11:10-12:10 S,T,W	Credit hours: 3

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. A. Saleh	Assis. Prof.	E732 Department of Mechatronics	9:30- 11:00	asaleh@philadelphia.edu.jo

Course module description:

This course provides the material needed for the basic understanding of the operation and design of internal combustion engines.

Course module objectives:

At completing this module the student should be able to:

- Recognize the basic types of internal combustion engines.
- Estimate the performance of internal combustion engines
- Know the fundamental thermochemistry as applied to fuels.
- Follow the various operational processes from intake to exhaust.
- Be familiar with cooling and lubrication systems.

Course/ module components

- **Books (title, author (s), publisher, year of publication)**
Title: Engineering Fundamentals of the Internal Combustion Engine
Author: W. W. Pulkrabek
Publisher: Prentice Hall
Edition : 2d, 2004

- **Support material (s) (vcs, acs, etc).**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable).**

Teaching methods:

- 3 Lectures a week
- 1-2 Appointments for tutorials and problem solving after each chapter

Learning outcomes:

- Knowledge and understanding
The student should be able to understand the different processes that takes place in IC engines and to know the different methods followed in designing the same engines.
- Cognitive skills (thinking and analysis).
Some assigned projects aim to develop the thinking and analysis capability of the students
- Communication skills (personal and academic).
Not applicable
- Practical and subject specific skills (Transferable Skills).
Some practical projects assigned aim to develop the practical capability of the students:
The students were divided in teams; each team had been chosen a portion of hydrogen internal combustion engine plant to be designed.

Assessment instruments

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

<u>Allocation of Marks</u>	
Assessment Instruments	Mark
First examination	20
Second examination	20
Final examination: 50 marks	50
Reports, research projects, Quizzes, Home works, Projects	20
Total	100

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.

Course/module academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction to Internal Combustion Engines	
(2)	Engine Design and Operating Parameters	
(3)	Tutorial and problem solving	
(4)	Air-Standard Cycles	
(5)	Air-Standard Cycles	
(6)	Tutorial and problem solving	
(7)	Thermochemistry and Fuels	Determination of fuel properties
(8)	Tutorial and problem solving	
(9) Mid Examination	Air and fuel induction	
(10)	Air and fuel induction	
(11)	Tutorial and problem solving	
(12)	Fuel Motion Within Combustion Chamber	
(13)	Tutorial and problem solving	
(14)	Combustion in SI and CI Engines	
(15)	Tutorial and problem solving	Design of hydrogen engine
(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.

Module references

Books

- Internal Combustion Fundamentals, By John B. Heywood
- Internal Combustion Engine in Theory and Practice, By P. L. Ballaney
- Internal Combustion Engines and Air Pollution, By F. D. Obert
- Internal Combustion Engines, By V. Ganesan, 10th ed.

Journals

- Journal of Heat Transfer
- Journal of Fluids Engineering
- Journal of Heat Transfer
- Journal of Engineering for Gas Turbines and Power

Websites

<http://www.amazon.com/Engineering-Fundamentals-Internal-Combustion-Engine/dp/>