The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Internal Combustion Engines	0934545	

2019 Course Catalog Description

Fundamentals of engines and their types. Review of air-standard, fuel-Air and actual cycles. Fuel and combustion. Fuel feeding systems. Engine testing and performance characteristics. Air pollution. Forced induction systems. The course also includes an experimental part which allows the student to estimate the performance of both spark ignition and compression ignition engines, effect of some parameters on engine performance like ignition timing, Air/Fuel ratio, compression ratio and perform an energy balance of the compression ignition engine.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title	Engineering Fundamentals of the Internal Combustion Engine	Internal Combustion Engines
Author(s)	Willard Pulkrabek	V. Ganesan
Publisher, Year, Edition	Pearson Prentice Hall, 2004, Second Edition	Tata McGraw-Hill,2012, 4th Edition

References

Books	1. Internal Combustion Engines Fundamentals, by J. B. Heywood 2. Introduction to internal combustion engines , by Richard Stone 3. A course in internal combustion engines, by M. L. Mathur
Journals	International Journal of Automotive Technology, http://www.springer.com/engineering/mechanical+engineering/journal/12239
Internet links	http://ocw.mit.edu/courses/mechanical-engineering/2-61-internal-combustion-engines-spring-2008/lecture-notes/

Prerequisites

Prerequisites by topic	-
Prerequisites by course	Thermodynamics (II) (0904342)
Co-requisites by course	-
Prerequisite for	

Topics Covered

Week	Topics	Chapter in Text	Books
1-2	Basics of Internal Combustion Engines	Chapters 1 & 2	Both Books
3	Ideal analysis of thermodynamic cycles	Chapter 3 & 4	Book No. 2
4	Fuel-Air thermodynamic cycle analysis	Chapter 5	Book No. 2
5	Actual analysis of thermodynamic cycles	Chapter 6	Book No. 2
6-7	Engine testing and performance	Chapter 15 & 16	Book No. 2
8	Fuels	Chapter 6	
9-11	Fuel feeding systems.	Chapter 8 & 9	
12	Ignition systems.	Chapter 11	
13-14	Combustion in SI and CI engines	Chapter 12	
15	Pollution formation and control	Chapter 15	
16	Cooling and lubrication systems (If time permits)	Chapter 13 & 14	
16	Forced induction systems (If time permits)	Chapter 19	

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Understand the fundamentals, operations, and performance of internal combustion engines and their different types. Also to calculate the various performance parameters of the engine.
2	2. Understand the types of fuels, fuel metering systems and understand their combustion process. Perform an engineering design.
4	3. Understand the environmental effect of engine pollution and learn how to reduce it.

Evaluation

Assessment Tools	Expected Due Date	Weight
Assignments		20 %
Midterm Exam		30 %
Final Exam		50 %

Contribution of Course to Meet the Professional Components

The course contributes to building the fundamental basic concepts of motion analysis and synthesis of basic linkages and machine components.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X	X		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