



Course Information

Course Title: Internal Combustion Engine Lab. (620520)
Prerequisite: Internal Combustion Engine (0620529)
Credit Hours: 1 credit hours (14 weeks per semester)
Textbook: Lab manual ,lecture notes
References: Engineering Fundamentals of Internal Combustion Engines by W.W Pulkrabek, second edition 2014.

Course Description:

Internal combustion Fundamentals, By John B. Heywood, Internal Combustion Engine in Theory and Practice By P.L.Ballaney

The course is a requirement for Mechanical engineering students. At completing this course, the student should be able to understand the introduction to internal combustion engines: Classifications, parts, combustion, applications.

Focus is on explaining the different between the performance of Otto and Diesel engine in terms of power, exhaust emissions, its relation to internal processes like combustion, gas exchange, and varying engine operating conditions.

Course requirements:

Computer, internet connection, webcam

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

Course Topics (Experiments):

Week	Experiment
1	Internal Combustion Engine (Introduction)
2	Four strokes Engines (differences between S.I. ad C.I engines).
3	Two Strokes Engines (differences between two strokes and four strokes engines).
4	Morse Test
5	Willan's Line Test
6	Full Load Performance
7	Heat Balance

8	Spark Ignition Engine (Ignition Loop)
9	Spark Ignition Engine (Mixture Loop)
10	Half Load Performance – Engine Breathing

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.	An ability to identify , formulate ,and solve complex engineering problems by Applying principles of engineering science, and mathematics.	[6]
2.	Analyze a problem and identify and define the computing requirements appropriate to its solution.	[6]
3.	An ability to acquire and apply new knowledge as needed ,using appropriate Learning strategies.	[6]
4.	Describe and explain different types of reciprocating internal combustion engines	[6]
5.	Compute power input, power output, thermal efficiency, and specific fuel consumption	[6]
6.	Describe and explain internal combustion engine and its classifications, engine friction, wear and lubrication.	[61]

Evaluation methods:

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

Reports: Each experiment has a report describing theory, procedure, readings, results, discussion, 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