

COURSE PLAN

FIRST: AUTOMOTIVE ENGINEERING

College

College : Faculty of Engineering Technology

Department : Mechanical Engineering Department

Course

Course Title : Internal Combustion Engines

Course Code : 020201223

Credit Hours : 3 (3 Theoretical, 0 Practical)

Prerequisite : 020201146

Instructor

Name : Dr. Waleed Momani

Office No. : 199

Tel (Ext) : 199

E-mail : Momani.w@bau.edu.jo

Office Hours

Class Times

Building	Day	Start Time	End Time	Room No.
00		00	00	00

Text Book

Title : • WILLARD W. PULKRABEK. Engineering Fundamental of the Internal Combustion Engine, 2004 Pearson Prentice –Hall, ISBN 0-13-191855-9

References

1. John B. Heywood, Internal Combustion Engine Fundamental, McGraw-Hill International E Richard Stone, Introduction to Internal Combustion Engines, \ Second Ed., 2007
2. Edward F. Obert, Internal Combustion Engines and Air Pollution, Harper and Raw, 1973
3. ditions, 1989

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

This course specifies a knowledge of engine principles of types and operation, theoretical and actual cycles. It also includes combustion in SI (spark Ignition) and CI (compression Ignition) Engines, induction and exhaust processes, engine charging, lubrication and wear, cooling system, exhaust gas analysis and air pollution.

COURSE OBJECTIVES

The objective of this course is to enable the student to do the following:

- Explain Engine and Classification.
- Explain Engine Cycle and Construction, Engine Calculation and Performance.
- Explain Engine system and fuel system, Lubricating and Cooling system
- Explain the difference between gasoline and diesel engines.
- Explain the characteristics of automobile exhaust gas.

COURSE LEARNING OUTCOMES

By the end of the course, the students will be able to:

- CLO1. Explain the engine and classification
- CLO2. Explain the engine cycle and construction
- CLO3. Explain the engine calculation and performance
- CLO4. Explain the engine system and fuel system
- CLO5. Explain the lubricating and cooling system
- CLO6. Explain the gasoline engine system
- CLO7. Explain the diesel engine system
- CLO8. Explain the exhaust gas system

COURSE SYLLABUS

Week	Unit	Content	Related LO and Reference (Chapter)	Proposed Assignments
1	Engine and Classification	<ul style="list-style-type: none"> • Introduction to the (ICE) • Fundamentals of engine, • Types of Ignition <ul style="list-style-type: none"> a) Spark Ignition (SI) b) Compression Ignition (CI) 	CLO1	
2	Engine Cycle	<ul style="list-style-type: none"> • Operation engine • Types • Four-Stroke Cycle. • Two-Stroke Cycle. 	CLO2	
3	Engine Construction	<ul style="list-style-type: none"> • Engine parts explained • Valve Location <ul style="list-style-type: none"> a) Valves in head (overhead valve) b) Valves in block (flat head). • Basic Design <ul style="list-style-type: none"> a) Reciprocating. b) Rotary. • Position and Number of Cylinders <ul style="list-style-type: none"> a) Single Cylinder. b) In-Line. c) V Engine. d) Opposed Cylinder Engine 	CLO2	
4	Engine Calculation and Performance	<ul style="list-style-type: none"> • Torque and Power • Air-Fuel Ratio and Fuel-Air Ratio 	CLO3	report

Week	Unit	Content	Related LO and Reference (Chapter)	Proposed Assignments
		<ul style="list-style-type: none"> • Specific Fuel Consumption • Engine Efficiency • Volumetric Efficiency • Emissions 		
5	Engine system fuel system 1	<ul style="list-style-type: none"> • Basic Fuel System • Guidelines for Safely Working on Fuel Systems. 	CLO4	
6	Engine system fuel system 2	<ul style="list-style-type: none"> • Engine system • Including both carburetor • Electronic fuel injection system, 	CLO4	report
7	Engine system fuel system 3	<ul style="list-style-type: none"> • Fuel Tanks • Filler Caps, Fuel Lines and Fittings • Fuel Filters • Fuel Pumps. 	CLO4	
8	Midterm Exam			
9	Lubricating Systems:	<ul style="list-style-type: none"> • Lubrication System • Engine Lubrication • Inspection of Lubrication System 	CLO5	report
10	Cooling Systems	<ul style="list-style-type: none"> • Type of Cooling <ol style="list-style-type: none"> a) Air Cooled b) Liquid Cooled • Water Cooled • Cooling System Diagnosis • Inspection of Cooling System • Testing for Leaks • Cooling System Service. 	CLO5	
11	Gasoline engine system 1	<ul style="list-style-type: none"> • Preliminary Checks • Basic EFI System 	CLO6	
12	Gasoline engine system 2	<ul style="list-style-type: none"> • Injector • Fuel Rail • Regulator Service. 	CLO6	
13	Gasoline engine system 3	<ul style="list-style-type: none"> • Electronic Throttle Controls • Idle Speed Checks. • Regulator, • Electronic Throttle Controls 	CLO6	
14	Diesel engine system:	<ul style="list-style-type: none"> • Preliminary Checks • Basic EFI System, Injector • Fuel Rail, Injector • Electronic Throttle Controls • Idle Speed Checks 	CLO7	
15	Exhaust gas system:	<ul style="list-style-type: none"> • Testing Emissions • Basic Inspection • Emission Control System • PCV System Diagnosis and Service • EGR System, • Catalytic Converter. 	CLO8	

Week	Unit	Content	Related LO and Reference (Chapter)	Proposed Assignments
16	Final Exam			

COURSE LEARNING RESOURCES

The effectiveness of teaching in this course depends on making students familiar with the internal combustion engines (ICE), the effect of various operating variables on engine performance, their quality requirements for SI- and CI-engines, and Describe engine heat transfer, Explain the mechanisms of exhaust gas emission formation, their reduction methods and their relations to the environment.

Teaching methods:

- Lectures and Home Works: using PowerPoint for, example, by the teacher to provide the students with the all information that they need,
- Online research skills, watching related videos such as you tube, on topics related to course objectives and recent developments in the field of specific work.
- Learning skills.

ONLINE RESOURCES

<https://www.barnesandnoble.com/w/automotive-technology-james-d-halderman>

ASSESSMANT TOOLS

(Write assessment tools that will be used to test students ability to understand the course material and gain the skills and competencies stated in learning outcomes

ASSESSMENT TOOLS	%
Quizzes	6
Quizzes	6
Researches and Reports	8
Mid Exam	30
Final Exam	50
TOTAL MARKS	100

THIRD: COURSE RULES

ATTENDANCE RULES

Attendance and participation are extremely important, and the usual University rules will apply. Attendance will be recorded for each lab. Absence of 10% will result in a first written warning. Absence more than 15% of the course with or without medical reasons will result in forfeiting the course and the student will not be permitted to attend the final examination

GRADING SYSTEM

Example:



0 – 49 Fail
50 – 100 Pass

REMARKS

{ The instructor can add any comments and directives such as the attendance policy and topics related to ethics }

COURSE COORDINATOR

Course Coordinator: Dr. Waleed Momani
Signature:
Date:

Department Head:
Signature:
Date: