

COURSE PLAN

FIRST: AUTOMOTIVE ENGINEERING

College

College : Faculty of Engineering Technology

Department : Mechanical Engineering Department

Course

Course Title : Automobile Electrical and Electronic Systems

Course Code : 020201261

Credit Hours : 3 (3 Theoretical, 0 Practical)

Prerequisite : 020201221+020300101

Instructor

Name : Dr. Suleiman Qasim Abu-Ein

Office No. :

Tel (Ext) :

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Office Hours :

Class Times

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

Text Book

Title : AUTOMOTIVE TECHNOLOGY A SYSTEMS APPROACH, Jack Erjavec (6th edition)

- Automobile Electrical and Electronic Systems, Tom Dentonn.

References

1. How to Diagnose and Repair Automotive Electrical Systems (Motorbooks Workshop), Tracy Martin.
2. Bosch Automotive Handbook, 10th Edition BOSCH10

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

This course specifies a knowledge of sensors, automotive batteries, actuators and electronic systems used in vehicles, including engine management systems, radios, in-vehicle entertainment systems, lighting, safety and signaling, control devices, fuel systems, and CAN bus technology.

COURSE OBJECTIVES

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

- Explain the principles of automotive batteries, ignition systems and input devices (sensors).
- Explain the principles of lights, safety, signaling, and instrumentation panel.
- Explain the principles of fuel systems.
- Explain actuator devices, ABS actuators et al.
- Explain principles of CAN bus technology for automotive application.

COURSE LEARNING OUTCOMES

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

- CLO1. Explain the **automotive batteries**
- CLO2. Explain the basics of **input devices (sensors)**
- CLO3. Explain the **lighting systems**
- CLO4. Explain the **ignition systems**
- CLO5. Explain the **fuel injection systems**
- CLO6. Explain **lights, safety, signaling**, driver information and control devices
- CLO7. Explain the basics of **output devices**
- CLO8. Explain the basics of CAN bus **technology**

COURSE SYLLABUS

Week	Unit	Content	Related PLO and Reference (Chapter)	Proposed assignments
1	The Automotive Batteries	<ul style="list-style-type: none"> • Purpose of Battery. • Battery Construction. • Cycling. • Electrochemical Reaction (Charging, Discharging). • Electrolyte (Specific Gravity of Electrolyte). • Factors Affecting Charging. 	CLO1	report
2	Input Devices -1	<ul style="list-style-type: none"> • Position / Speed Sensor. • Crankshaft Position Sensor. • Camshaft Position Sensor. • Air Flow Sensor. 	CLO2	
3	Input Devices -2	<ul style="list-style-type: none"> • M A P Sensor • Engine Coolant Temperature • Throttle Position Sensor 	CLO2	
4	Input Devices -3	<ul style="list-style-type: none"> • Oxygen Sensors • Knock Sensor, • Sensors applications. 	CLO2	report
5	Lighting Systems -1	<ul style="list-style-type: none"> • Lamps. • Headlights: • Sealed-Beam Headlights. • Composite Headlights. • High-Intensity (HID) • Dimmer Switches. 	CLO3	
6	Lighting Systems -2	<ul style="list-style-type: none"> • Headlight Circuits. • Automatic Light Systems. • Adaptive Headlights. • Interior Light Assemblies. • Rear Exterior Light Assemblies (Turn, Stop, and Hazard Warning Light Systems). 	CLO3	report
7	Ignition Systems -1	<ul style="list-style-type: none"> • Ignition Timing. • Basic Circuitry. • Ignition Components. • Spark Plugs. • Triggering and Switching Devices. 	CLO4	

Week	Unit	Content	Related PLO and Reference (Chapter)	Proposed assignments
8	Mid Exam			
9	Ignition Systems -2	<ul style="list-style-type: none"> • Engine Position Sensors (Magnetic Pulse Generator, Metal Detection Sensor, Hall-Effect Sensor, Photoelectric Sensor, Timing Advance). • Distributor Ignition System Operation. • Electronic Ignition System Operation. 	CLO4	report
10	Electronic Fuel Injection (EFI) -1	<ul style="list-style-type: none"> • Types of Fuel Injection. • Basic EFI (Powertrain Control Module, System Operation) • Fuel Injectors. • Idle Speed Control. 	CLO5	
11	Electronic Fuel Injection (EFI) -2	<ul style="list-style-type: none"> • Throttle Body Fuel Injection. • Port Fuel Injection. • Sequential Fuel Injection Systems. • Central Multiport Fuel Injection. • Gasoline Direct – Injection System. 	CLO5	report
12	Lights, Safety, and signaling and driver information and control devices -1	<ul style="list-style-type: none"> • Safety and signaling. • Driver information. • Control devices (fuel level, windshield wipers, etc.) 	CLO6	
13	Lights, Safety, and signaling and driver information and control devices -2	<ul style="list-style-type: none"> • Horn and horn relay • Vehicle security systems • Seat belts • Air bags • Wind shield wiper and washers • Instrumentation Panel 	CLO6	report
14	Output Devices	<ul style="list-style-type: none"> • Actuators • Fuel injectors • Idle Speed Control • ABS actuators 	CLO7	report
15	CAN bus Technology	<ul style="list-style-type: none"> • Multiplex system • Data bus networking 	CLO8	report
16	Final Exam			

COURSE LEARNING RESOURCES

The effectiveness of teaching in this course depends on making students familiar with the basic automotive electrical and electronic systems, such as batteries, input devices (sensors), lighting systems, ignition systems, fuel systems, lights, safety, signaling, driver information and control devices, output devices, CAN bus technology.

Teaching methods:

- Lectures and HomeWorks: using PowerPoint for, example, by the teacher to provide the students with the all information that they need, and to give them a home work as a research method or/and reports.
- 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 and adaptability: Developed by transferring students and reconfiguring work teams to enable them to adapt to other individuals from time to time.

ONLINE RESOURCES

www.autoshop101.com

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	10
Researches and Reports	
Participation	
Oral Exams	
Activities/attendance	
Presentation	10
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 class. Absence of 10% will result in a first written warning. Absence of 15% of the course will result in a second warning. Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination. Should a student encounter any special circumstances (i.e. medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records.

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. Suleiman Abu-Ein
Signature:
Date:

Department Head:
Signature:
Date: