Engineering Program

Specialization	**Automotive Maintenance**
Course Number	20211151
Course Title	**Automotive electrical & power accessories systems**
Credit Hours	**2**
Theoretical Hours	**2**
Practical Hours	**0**

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008**

Brief Course Description:

Introduction, battery, starting system, charging system, air conditioning system(HVAC), lights, safety and signaling system , wiring harnesses, instrument panel, windows and mirrors ,immobilizer system ,door lock and alarm system ,wiper and washer system ,horn system ,computer controlled lighting system .

Course Objectives:

Upon the completion of this course, the student will be able to:

1. Identify automotive electrical systems components by names, functions and locations.
2. Identify different types and models for each circuit.
3. Outline the operation of automotive electrical systems.
4. Understand circuit diagrams for each system.

Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed(hr)
1.	**Introduction**	▪ Classification of automotive electrical circuits. ▪ Basic elements of automotive electrical circuit. ▪ Symbols and terminology of basic elements.	**2**
2.	**Battery**	▪ Battery function and operation. ▪ Kinds of battery. ▪ The structure of the lead acid battery and the charging and discharging operation. ▪ Various characteristic of the lead acid battery.	**3**
3.	**Stating system**	▪ Purpose and Starting requirements. ▪ Starting system for passenger cars and commercial vehicles. ▪ Electrical starter motor operation principle and design. ▪ Solenoid switch, pinion-engaging drive and overrunning clutch operation and design. ▪ Starter types. ▪ Starting system electrical circuit.	**4**
4.	**Charging system**	▪ Purpose and Starting requirements. ▪ Single phase and 3-phase alternating current. ▪ Direct current and alternating current alternators. ▪ Alternator voltage regulator.	**4**
5.	**Automotive lighting, signaling and horn systems.**	▪ Headlight system construction and operation. ▪ Clearance lights and tail lights construction and operation. ▪ Stop lights and back up lights construction and operation.	**4**

		▪ Direction indicators and hazard warning system construction and operation.	
		▪ Computer controlled lighting system	
6.	**Instrument panel**	▪ Introduction. ▪ Indicators and bulbs. ▪ Voice warning system. ▪ Digital combination meter.	**2**
7.	**Windows and mirrors**	▪ Introduction. ▪ Windows system main components. ▪ Electrical circuit operation. ▪ Driver main switch drive. ▪ Door sub switch drive. ▪ Mirrors flexible mechanism. ▪ Horizontal and vertical direction adjustment. ▪ Mirror electrical circuit operation.	**3**
8.	**Immobilizer ,door lock and alarm systems**	▪ Immobilizer system operation. ▪ Immobilizer programming. ▪ Electrically controlled door lock system components and operation. ▪ Alarm system construction and operation.	**2**
9.	**Wiper and washer system**	▪ Purpose and construction. ▪ Electrical circuit operation ▪ Wipers' speeds. ▪ Systems operation.	**3**
10.	**Ventilating ,heating and air conditioning (HVAC) system**	▪ Ventilating the passenger compartment. ▪ Passenger compartment heater. ▪ Heater controls and heated air distribution. ▪ Rear window defogger. ▪ Refrigeration and cooling. ▪ Air conditioning system components and operation. ▪ Heater –air-condition system.	**4**

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
Homework and Projects Discussions and lecture Presentations		10%	

Teaching Methodology:

- Lectures and presentations

Text Book

1. Electric and electronic systems / BOSCH / Automotive technology / forth edition.

References

1. Comfort and safety system / BOSCH / Automotive technology / forth edition
2. Electric and electronic systems / BOSCH / Automotive technology / forth edition.