



كلية الهندسة التكنولوجية



جامعة البلقاء التطبيقية

الخطط الدراسية لبرنامج الشهادة

الجامعية المتوسطة

تخصص الأوتو ترونكس

2008/2009

جامعة البلقاء التطبيقية

كلية
الهندسة
التكنولوجية

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Curriculum for Associate Degree Program in Autotronics Specialization

The curriculum of associate degree in “Autotronics” specialization consists of (72 credit hours) as follows:

Serial No.	Requirements	Credit Hours
First	University Requirements	12
Second	Engineering Program Requirements	17
Third	Specialization Requirements	43
Total		72



**The curriculum of associate degree
in
Autotronics Specialization**

First: University requirements (12 credit hours) as follows:

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
22001101	Arabic Language	3	3	-	
22002101	English Language	3	3	-	
21901100	Islamic Culture	3	3	-	
21702101	Computer Skills	3	1	4	
Total		12	10	4	

Second: Engineering program requirements (17 credit hours) as follow:

Course No	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20201111	Engineering Workshops	1	-	3	-
20204111	AutoCAD	2	-	6	-
20506111	Occupational Safety	2	2	-	-
21301111	General Mathematics	3	2	2	-
21302111	General Physics	3	2	2	-
21302112	General Physics Laboratory	1	-	3	-
21702111	Communication Skills and Technical Writing	3	2	2	22002101
20201121	Engineering Materials	2	2	-	-
Total		17	10	18	

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

Third: Specialization Requirements (43 credit hours) as follows:

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20301113	Electrical Circuits	3	3	0	21302111*
20301114	Electrical Circuits Lab	1	0	3	20301113*
20403111	Electronics	3	3	0	20301113*
20403112	Electronics Lab	1	0	3	20403111*
20404121	Digital Fundamentals	2	2	0	20403111
20404122	Digital Fundamentals Laboratory	1	0	3	20404121*
20210111	Automobile Sensing Devices and Instrumentation	3	3	0	20207141
20210112	Automobile Sensing Devices and Instrumentation Laboratory	1	0	3	20210111*
20209111	Thermal Engineering	3	3	0	21302111*
20209112	Thermal Engineering Laboratory	1	0	3	20209111*
20207131	Internal Combustion Engines	3	3	0	20209111
20207132	Internal Combustion Engines Laboratory	1	0	3	20207131*
20207141	Automobile Engineering	3	3	0	-
20207142	Automobile Engineering Workshop	1	0	3	20207141*
20210221	Automobile Electricity and Electronics	3	3	0	20403111 or 20301111
20210222	Automobile Electricity Laboratory	1	0	3	20210221*
20210223	Automobile Electronics Laboratory	1	0	3	20210221*
20207251	Automobile Diagnosis and Maintenance	3	3	0	20207141
20207252	Automobile Diagnosis and Maintenance Laboratory	1	0	3	20207251*
20210231	Automobile Electricity and Electronics Workshop	1	0	3	20210221*
20210291	Training**	3	0		-
20210292	Project	3	0		-
Total		43	25		

*-Co-requisite

** Equivalent to 280 training hours

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

Guiding Plan

First Year					
First Semester			Second Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
22001101	Arabic Language	3	20403121	Electronics	3
20301181	Electrical Circuits	3	20403122	Electronics Lab	1
20301182	Electrical Circuits Lab	1	22002101	English Language	3
21702101	Computer Skills	3	21302111	General Physics	3
21301111	General Mathematics	3	21302112	General Physics Lab	1
20204111	AutoCAD	2	20201111	Engineering Workshops	1
21901100	Islamic Culture	3	20404121	Digital Fundamentals	2
			20506111	Occupational Safety	2
			20201121	Engineering Materials	2
Total		18	Total		18

Second Year					
Third Semester			Fourth Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
20207142	Automobile Engineering Workshops	1	20207251	Automobile Diagnosis and Maintenance	3
20207131	Internal Combustion Engines	3	20207252	Automobile Diagnosis and Maintenance Laboratory	1
20207132	Internal Combustion Engines Laboratory	1	20210231	Automobile Electricity and Electronics Workshops	1
20404122	Digital Electronics Lab	1	20210291	Training	3
20207141	Automobile Engineering	3	20210292	Project	3
20210221	Automobile Electricity and Electronics	3	20210111	Automobile Sensing Devices and Instrumentation	3
20210222	Automobile Electricity Laboratory	1	20210112	Automobile Sensing Devices and Instrumentation Laboratory	1
20210223	Automobile Electronics Laboratory	1	21702111	Communication Skills and Technical Writing	3
20209111	Thermal Engineering	3			
20209112	Thermal Engineering Laboratory	1			
Total		18	Total		18

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

Brief Course Description

University Requirements

Course Title	Course No	Credit Hours (Theoretical /Practical)
Arabic Language	22001101	3 (3-0)
<p>تتضمن هذه المادة مجموعة من المهارات اللغوية بمستوياتها وأنظمتها المختلفة: الصوتية، والصرفية، والنحوية، والبلاغية، والمعجمية، والتعبيرية، وتشتمل نماذج من النصوص المشرقة: قرآنية، وشعرية، وقصصية، من بينها نماذج من الأدب الأردني؛ يتوخى من قراءتها وتدوقها وتحليلها تحليلاً أدبياً؛ تنمية الذوق الجمالي لدى الطلاب الدارسين.</p>		
English Language	22002101	3 (3-0)
<p>English 1 is a general course. It covers the syllabuses of listening, speaking, reading, writing, pronunciation and grammar, which are provided in a communicative context. The course is designed for foreign learners of the English language, who have had more than one year of English language study. The extension part would be dealt with in the class situation following the individual differences.</p>		
Islamic Culture	21901100	3 (3-0)
<ol style="list-style-type: none"> 1. تعريف الثقافة الإسلامية وبيان معانيها وموضوعاتها والنظم المتعلقة بها - وظائفها وأهدافها. 2. مصادر ومقومات الثقافة الإسلامية والأركان والأسس التي تقوم عليها. 3. خصائص الثقافة الإسلامية. 4. الإسلام والعلم، والعلاقة بين العلم والإيمان 5. التحديات التي تواجه الثقافة الإسلامية. 6. رد الشبهات التي تثار حول الإسلام. 7. الأخلاق الإسلامية والأداب الشرعية في إطار الثقافة الإسلامية. 8. النظم الإسلامية. 		
Computer Skills	21702101	3 (1-4)
<p>An introduction to computing and the broad field of information technology is given. Topics covered include the basic structure of digital computer system, microcomputer, operating systems, application software, data communication and networks, and the internet. Hands-on learning emphasizes Windows xp, MS-office2000, and the internet.</p>		

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

Engineering Program requirements

Engineering Workshops	20201111	1 (0-3)
Development of basic manual skills in Mechanical and Electrical works. Use of manual tools and measuring devices. Hand filing, welding, metal cutting and forming. Electrical wiring.		
AutoCAD	20204111	2 (0-6)
Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. Geometric construction. Dimensioning, free –hand sketching, object representation, orthographic drawing and projections.		
Occupational safety	20506111	2 (2-0)
Role of technicians in economic development First aid accident prevention. Protective devices and equipment. Industrial safety standards. Nature of fire hazards. Sand fire regulations. Physiological effects of electrical shock on human body. First aid and treatment for the effects of electric shock. Rules of spare and chemicals storage and handing.		
Communication Skills and Technical Writing	21702111	3 (2-2)
The main goal of this course is to equip the students with the necessary communication skills in everyday life & work situations and improve their abilities in technical writing to meet market needs. For this course, the English language is the language of teaching & the means of communication for all classroom situations.		
Engineering Materials	20201121	2 (2-0)
Definition of engineering materials. Classification of materials and their properties. Metallic and non-metallic materials. Metals, alloys and composite materials. Conductors, insulators and semiconductors. Mechanical, Magnetic, Thermal and electrical characteristics of materials. Industrial applications of different types of materials.		
General Mathematics	21301111	3 (2-2)
Real numbers coordinate planes, lines, distance and circles. Functions: (operations and graphs on functions), limits, continuity, limits and continuity of trigonometric functions. Exponential and logarithmic functions. Differentiation (techniques of differentiation, chain rule, implicit differentiation). Application of differentiation (increase, decrease, concavity). Graphs of polynomials. Applications: Rolle's Theorem and Mean-Value Theorem, Integration (by substitution, definite integral, fundamental theorem of Calculus). Application of definite integral (area between two curves, volumes)		
General Physics	21302111	3 (2-2)
Physics and measurement, motion in one dimension, vectors, laws of motion, circular motion, energy and energy transfer, potential energy, linear momentum and collisions, electric fields, Gauss's law, electric potential, capacitance and dielectrics, current and resistance, direct current circuits, magnetic fields, sources of the magnetic field, and Faraday's law of electromagnetic induction.		
General Physics lab	21302112	1 (0-3)
In this course, the student performs thirteen experiments in mechanics and in electricity.		

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

Specialization Requirements

Electrical Circuits	20301113	3 (3-0)
Voltage, Current, and Resistance, Ohm's Law, Energy and Power, Series-Parallel Circuits, Introduction to Alternating Current and Voltage, Capacitors, Inductors, RLC Circuits and Resonance. Electrical Measurements.		
Electrical Circuits Lab.	20301114	1 (1-3)
DC and AC circuits. Resonance. Measuring devices.		
Electronics	20403111	3 (3-0)
Semiconductor devices. Diodes: classification, characteristics and applications. Transistors: classification, characteristics and applications. Amplifiers. Oscillators. Logic gates and Integrated circuits: Basic functions, symbols and applications. Introduction to electronic measurements: Oscilloscope applications.		
Electronics Lab.	20403112	3 (0-3)
Use of oscilloscope in measurements. Investigation of characteristics of semiconductor devices. Construction and study of electronic circuits. Experiments in electronics have to cover the main electronic devices (diode, zener diode, diode applications, BJT, FET, op – amp, oscillator, SCR).		
Digital Fundamentals	20404121	2 (2-0)
Numerical systems, operations, and codes, logic gates, Boolean algebra and logic simplification, combinational logic and function of combinational logic, flip – flops, counters, shift registers. Fixed – function Integrated Circuits, and Programmable Logic Devices (PLDs).		
Digital Fundamentals Lab.	20404122	1 (0-3)
Experiments in digital fundamentals have to cover logic gates, combinational logic, flip – flops, counters, shift registers.		
Automobile Sensing Devices and Instrumentation	20210111	3 (3-0)
Automobile instrumentation. Automobile sensors and transducers. Data acquisition. Signal conditioning. Interface. Control loops. Examples.		
Automobile Sensing Devices and Instrumentation Lab.	20210112	1 (0-3)
Testing and troubleshooting automobile sensors and transducers. Practical experiments related to automobile instrumentation and control.		

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

Thermal Engineering	20209111	3 (3-0)
Concepts and definitions, Properties of a pure substance, Work and heat, the first law of thermodynamics, the second law of thermodynamics, Principles of heat transfer Steady state conduction, Radiation, Heat exchangers		
Thermal Engineering Lab.	20209112	1 (0-3)
Pressure – Temperature relation in the saturation region; Compressor cycles and analyses; Heat pump performance; Conduction heat transfer; Radiation heat transfer; and Heat exchanger performance		
Internal Combustion Engines	20207131	3 (3-0)
Definition and introduction to the (ICE) fundamentals of engine, operation engine types and classification, engine construction, engine measurements and performance, engine system (lubrication, cooling, fuel) Including both carburetor and electronic fuel injection system .		
Internal Combustion Engines Lab.	20207132	1 (0-3)
Performance tests for spark and compression engines, air and fuel consumption, air fuel ratio bake and indicated horse power. Specific fuel consumption, volumetric efficiency energy balance, variable compression ratio rest engine emission, diagnostic, adjustment of engine.		
Automobile Engineering	20207141	3 (3-0)
Introduction of fundamentals of engine construction and operation, engine systems, automotive transmission (manual and automatic), suspension system, wheel alignment, automotive brake system, steering system, automotive electric and electronic systems.		
Automobile Engineering Workshops	20207142	1 (0-3)
Personal safety, automotive workshop safety area Universal hand tools and equipments, special tools used in automotive workshop, car's units disassembly / assembly and adjustments.		
Automobile Electricity and Electronics	20210221	3 (3-0)
Introduction, battery, starting system, charging system, ignition system, electronic fuel injection system, lights, safety and signaling, driver information and control devises, wiring harnesses, instrument panel, (CANbus) technology for automotive application.		

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

Automobile Electricity Lab.	20210222	1 (0-3)
Battery testing, Starting system, Diagnostics and maintenance, Ignition systems, Diagnostics and maintenance Lights, Safety and Signaling, Automotive, generators automatic control system.		
Automobile Electronics Lab.	20210223	1 (0-3)
Testing and inspection of sensors, actuators, relays. Electronic systems in modern cars: Ignition, fuel, ...		
Automobile Diagnosis and Maintenance	20207251	3 (3-0)
Introduction to automotive diagnostics, maintenance and repair, theoretical background about automotive diagnostics, maintenance and repair, types of automotive diagnostics, maintenance and repair, types of automotive maintenance Inspection and service of car components: engine, engine system, transmission, broke system, suspension system, steering		
Automobile Diagnosis and Maintenance Lab.	20207252	1 (0-3)
Equipments and devices for automotive diagnosis, maintenance repair personal skills in performing inspection and service of cars .Components: engine, transmission, brake system, steering system, suspension system, suspension system and electrical equipments.		
Automobile Electricity and Electronics Workshops	20210231	1 (0-3)
Safety rules and standards in Autotronics workshops. Use of SCAN tools for testing and inspection of modern cars.		
Training	20210291	3 (280 training hours)
Equivalent to (280 hours) of field training targeted to emphasize the ability of students to apply the theories in the real world of the profession.		
Project	20210292	3
An integrated assembly/design practical work related to the major fields of study.		





Engineering Program

Specialization	Common
Course Number	20207251
Course Title	Automotive diagnosis and maintenance
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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



Brief Course Description:

- ❖ Introduction to automotive diagnostics, maintenance and repair, theoretical background about automotive diagnostics, maintenance and repair, types of automotive diagnostics, maintenance and repair, types of automotive maintenance Inspection and service of car components: engine, engine system, transmission, broke system, suspension system, steering

Course Objectives:

1. Name the diagnosis tools and equipments commonly used in vehicle repair works.
2. Describe the basic applications and operation of these tools.
3. Know the types of maintenance and repair of automobiles.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Theoretical back ground of automotive service , types of service	<ul style="list-style-type: none"> ▪ Theoretical background ▪ Pre_delivery service ▪ Preventive maintenance ▪ Season maintenance ▪ 1st and 2nd maintenance 	
2.	Engine diagnostics ,maintenance and repair	<ul style="list-style-type: none"> ▪ Engine condition inspection and evaluation ▪ Engine maintenance engine systems maintenance ▪ Engine adjustments, engine systems adjustments 	
3.	Transmission diagnostics, maintenance and repair	<ul style="list-style-type: none"> ▪ Clutch inspection ▪ Clutch maintenance and adjustment ▪ Manual and automatic gear box inspection ▪ Manual and automatic gear box maintenance and adjustment ▪ Final drive inspection and service ▪ Final drive inspection and service ▪ Axis and wheel and service 	
4.	Suspension and steering inspection and service	<ul style="list-style-type: none"> ▪ Suspension components inspection and service ▪ Steering components inspection and service ▪ Wheel alignment 	
5.	Brake system inspection and service	<ul style="list-style-type: none"> ▪ Master cylinder inspection and service ▪ Wheel cylinder inspection and service ▪ Hand brake inspection and service ▪ Anti – lock brake system (ABS) inspection and service 	

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



Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/------
	Second Exam	20%	--/------
	Assignments	10%	--/------
	Final Exam	50%	--/------
Discussions and lecture Presentations			

Teaching Methodology:

- ❖ Lectures and presentations

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Common
Course Number	20207284
Course Title	Automotive diagnosis and maintenance Lab.
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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



Brief Course Description:

- ❖ Equipments and devices for automotive diagnosis
Maintenance repair personal skills in performing inspection and service of cars
Components: engine, transmission, brake system, steering system, suspension system, suspension system and electrical equipments.

Course Objectives:

1. Studying the equipments for automotive diagnosis and repair.
2. Obtain the applied skills needed to come over the works related to automotive diagnosis, maintenance and repair.



Detailed Course Description:

lab Number	lab Name	lab Content	Time Needed
1.	Engine inspection and service	<ul style="list-style-type: none"> ▪ Engine condition inspection and evaluation thru :compression test, leakage test, vacuum test ▪ Engine applied service ▪ Engine applied adjustment : RPM, CO% ▪ In exhaust gases ▪ Engine systems applied service and adjustments 	
2.	Transmission inspection and service	<ul style="list-style-type: none"> ▪ Applied clutch inspection ▪ Clutch service and clutch pedal free travel adjustment ▪ Gear box and dire shaft inspection ▪ Final drive gear clearance adjustment ▪ Axes and wheel inspection and service ▪ Wheel bearing clearance adjustment 	
3.	Suspension and steering systems inspection and service Practically	<ul style="list-style-type: none"> ▪ Inspection and service of suspension system components ▪ Steering system inspection and service ▪ Wheel alignment 	
4.	Brake system inspection and service practically	<ul style="list-style-type: none"> ▪ Master cylinder and wheel cylinder inspection and service ▪ Shoes_ drum clearance adjustment ▪ Hand broke adjustment ▪ (abs) inspection and service 	

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



Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/------
	Reports	30%	--/------
	Final Practical Exam	50%	--/------

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Autotronics
Course Number	2010231
Course Title	Automobile Electricity and Electronics Workshops
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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



Brief Course Description:

Safety rules and standards in Autotronics workshops. Use of SCAN tools for testing and inspection of modern cars.

Course Objectives:

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

1. Inspect and test different systems in modern cars
2. Use SCAN Tools in testing and inspection



Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed
1.	Safety in Autotronics workshops	<ul style="list-style-type: none"> ▪ Personal safety ▪ Tools safety ▪ Universal hand tools ▪ Special tools 	
2.	Ignition system testing	<ul style="list-style-type: none"> ▪ Single point ignition ▪ Multiple point ignition 	
3.	Sensors system	<ul style="list-style-type: none"> ▪ Disassembly/ assembly and diagnoses and repair all sensors ▪ Use SCAN tools 	
4.	Diesel engine	<ul style="list-style-type: none"> ▪ Diagnoses and testing ▪ Use SCAN tools 	
5.	ABS system	<ul style="list-style-type: none"> ▪ Diagnoses and testing ▪ Use SCAN tools 	
6.	Air conditioning system	<ul style="list-style-type: none"> ▪ Diagnoses and testing ▪ Use SCAN tools 	
7.	SCAN tools OBD1, OBD2 systems	<ul style="list-style-type: none"> ▪ Diagnoses and testing ▪ New car technology 	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	
	Reports	30%	
	Final Exam	50%	

Teaching Methodology:

- ❖ Workshops

Text Book

1. Instructional materials and Lab. Sheets prepared by Instructor



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



Engineering Program

Specialty	Common
Course Number	20210222
Course Title	Automotive Electricity Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

Brief Course Description:

- ❖ Battery testing, Starting system, Diagnostics and maintenance, Ignition systems, Diagnostics and maintenance Lights, Safety and Signaling, Automotive, generators automatic control system.

Course Objectives:

1. Describe the contraction and operation electricity and electronic systems.
2. Diagnosis and service ignition systems, engine fuel – fuel in injection and electronic.
3. Diagnosis and service Lights, Signaling, Generators.
4. Diagnosis and service control systems.
5. Diagnosis and service Sensors and Ecm and Testing.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	Battery Testing Service	<ul style="list-style-type: none"> ▪ Battery construction ▪ Analyzing Battery ▪ Open circuit voltage test ▪ Hydrometer test ▪ Specific gravity ▪ Charging – Indicator ▪ Battery load test 	
2.	Starting system service	<ul style="list-style-type: none"> ▪ Cranking voltage test ▪ Voltage prop test ▪ Current Draw test ▪ Starting motor Bench tests ▪ No – load test ▪ Removing and Installing starting motor ▪ Servicing starting motor ▪ Jump starting 	
3.	Ignition systems service	<ul style="list-style-type: none"> ▪ Ignition Switches testing ▪ Testing Coil, Distributor Secondary Ignition, Primary ▪ Diagnosis and Services contact point, primary and secondary Voltage 	
4.	Charging System Service	<ul style="list-style-type: none"> ▪ Charging system troubles ▪ Checking the drive belt ▪ Charging system testing ▪ Charging system out put test ▪ Charging system maintenance ▪ Removing and Installing Alternator ▪ Alternator service 	
5.	Electronic fuel injection service	<ul style="list-style-type: none"> ▪ Fuel Injection trouble ▪ Checking fuel injection ▪ Testing fuel pump and capacity and pressure ▪ Testing fuel pressure regulator ▪ Testing fuel injectors ▪ Malfunction – Indicator light ▪ Interpreting trouble codes and scan data 	

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

		<ul style="list-style-type: none"> ▪ Sensor diagnosis ▪ ECM diagnosis ▪ Air and fuel filter service ▪ Electric fuel pump service ▪ Cleaning and service fuel injectors ▪ Cleaning throttle- body and injector service 	
6.	Lights, Safety, and Signaling, Driver Information, and control devices	<ul style="list-style-type: none"> ▪ Testing the light bulbs and service ▪ Testing horn and horn relay and service ▪ Testing security system and service ▪ Testing, seat belts, air bags and service ▪ Testing wind shield wipers and washers and service ▪ Testing Instrument panel and service ▪ Networks and multiplexing testing and service ▪ Testing other electrical and electronic devices 	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Med term Exam	20%	--/--/----
	Assignments	30%	--/--/----
	Final Exam	50%	--/--/----

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.

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



Engineering Program

Specialization	Common
Course Number	20210223
Course Title	Automobile Electronics Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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



Brief Course Description:

Testing and inspection of sensors, actuators, relays. Electronic systems in modern cars: Ignition, fuel, ...

Course Objectives:

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

- 1.
- 2.
- 3.
- 4.



Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed
1.	Engine load sensors	<ul style="list-style-type: none"> ▪ Air flowmeter location and inspection ▪ Electronic injection location and inspection 	
2.	Engine speed and position sensors	<ul style="list-style-type: none"> ▪ Camshaft position sensor and crank shaft location and inspection 	
3.	Oxygen and fuel sensors	<ul style="list-style-type: none"> ▪ Carbon monoxide, nitrous oxide ▪ Hydrocarbons lambda value location and inspection 	
4.	Composition and shock sensors	<ul style="list-style-type: none"> ▪ Signals of knock sensors location and inspection ▪ Airbag location and inspection ▪ Fuel security system location and inspection 	
5.	Actuators	<ul style="list-style-type: none"> ▪ Fuel injection, closed loop control ▪ Acceleration and deceleration ▪ Idle speed ▪ Single point injection ▪ Multi point injection ▪ Location and inspection 	
6.	Relays	<ul style="list-style-type: none"> ▪ Switching batteries ▪ Double starting ▪ Stopping the start with engine running ▪ Thermal time switch 	
7.	Cold start Control	<ul style="list-style-type: none"> ▪ Cold start of engine ▪ Engine warm-up ▪ Location and inspection 	
8.	Electronic ignition control	<ul style="list-style-type: none"> ▪ Timing the closed loop ignition ▪ Fast regulation of the spark lead ▪ Slow regulation of the spark lead ▪ Location and inspection 	
9.	Sensors	<ul style="list-style-type: none"> ▪ Coolant temperature, air temperature ▪ Vacuum sensor, warning light ▪ Throttle position sensor 	

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



Evaluation Strategies:

Exams		Percentage	Date
Exams	Reports	30%	
	Midterm	20%	
	Final Exam	50%	

Teaching Methodology:

- ❖ Laboratory

Text Book

1. Instructional Lab. Sheets



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



Engineering Program

Specialization	Common
Course Number	20207141
Course Title	Automotive Engineering
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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

Brief Course Description:

- ❖ Introduction of fundamentals of engine construction and operation, engine systems, automotive transmission (manual and automatic), suspension system, wheel alignment, automotive brake system, steering system, automotive electric and electronic systems.

Course Objectives:

1. A system approach of understanding all automotive systems and their various subsystems
2. Understanding the important of safety and accident prevention in an automotive workshop.
3. Outline the basic of both gasoline and diesel engines.
4. Outline the basics of al automotive systems and subsystems.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction Car Construction	<ul style="list-style-type: none"> ▪ Historical background, car components and their functions ▪ Automotive engines 	
2.	Introduction To Engines	<ul style="list-style-type: none"> ▪ Engine types ▪ Engine systems ▪ Differences between automotive engines and other types of engines ▪ Engine classification according to: <ul style="list-style-type: none"> 0 number and arrangement of cylinders Value arrangement in cylinder head 	
3.	Engine construction	<ul style="list-style-type: none"> ▪ Types of cylinders blocks cylinders ▪ Types of pistons ▪ Types of cylinder head ▪ Types of combustion chambers ▪ Connecting rod ▪ Engine gaskets ▪ Crankshaft ▪ Parts attached to cylinder block ▪ Oil pan 	
4.	Engine systems	<ul style="list-style-type: none"> ▪ Cooling system ▪ Lubricating system ▪ Fuel-feeding system ▪ Ignition system 	
5.	Transmission	<ul style="list-style-type: none"> ▪ Friction clutch ▪ Manual gear box ▪ Synchronize gear box ▪ Inter lock devices ▪ Automatic gear box ▪ Planetary gearing system ▪ Hydraulic torque convertor ▪ Automatic (hydraulic) gear shifting system ▪ Relationship between gear ratio, torque and rpm ▪ Final drive and drive shaft 	

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

6.	Suspension system	<ul style="list-style-type: none"> ▪ Purpose of suspension system ▪ Components of suspension system ▪ Types of springs used in suspension ▪ Shock absorbers types , purpose and operation ▪ Automatic level control ▪ Rear suspension ▪ Front suspension me pherson type ▪ Front suspension ▪ Electronic suspension and ride control ▪ Air suspension 	
7.	Steering system	<ul style="list-style-type: none"> ▪ Purpose of steering system ▪ Steering system components ▪ Types of steering gears (recirculating-ball steering gear, rack and pinion) ▪ Steering ratio ▪ Power steering systems, components of power steering, power steering types ▪ Steering electric power ▪ Four –wheel steering 	
8.	Wheel alignment	<ul style="list-style-type: none"> ▪ Toe- in, Toe- Out ▪ Camber angle ▪ Wheel axis inclination ▪ Caster angle 	
9.	Braking system	<ul style="list-style-type: none"> ▪ Working principle of automotive (hydraulic) brake system ▪ Types of wheel brake mechanism ▪ Brake system components ▪ Servo brake ▪ Brake master cylinder (construction) ▪ Anti lock brake system(abs),types components and working principle ▪ Traction control system, purpose components and operation 	

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



Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/------
	Second Exam	20%	
Homeworks and quizzes		10%	
	Final Exam	50%	

Teaching Methodology:

1. Lectures and presentations

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Common
Course Number	20207182
Course Title	Automotive Engineering Workshops
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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



Brief Course Description:

- ❖ Personal safety, automotive workshop safety area Universal hand tools and equipments, special tools used in automotive workshop, car's units disassembly / assembly and adjustments.

Course Objectives:

1. Obtain applied skills in disassembly / assembly of all automotive systems and subsystems.
2. Obtain practical skills for using the tools and devices automotive diagnosis, maintenance and repair.
3. Obtain practical skills for implementing the maintenance and repair procedures.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	Safety in automotive workshop tools and equipments	<ul style="list-style-type: none"> ▪ Personal safety ▪ Tool and equipment safety ▪ Universal hand tools ▪ Special tools for automotive mechanics 	
2.	Engine disassembly , assembly and inspection	<ul style="list-style-type: none"> ▪ Disassembly /assembly of cooling system ▪ Disassembly/assembly of lubricating system ▪ Disassembly/assembly of adjustment of gasoline engine fuel system ▪ Disassembly / assembly and adjustment of diesel engine fuel system 	
3.	Engine reconditioning	<ul style="list-style-type: none"> ▪ Disassembly \ assembly of cramesheft ▪ Piston group disassembly \ assembly ▪ Camshaft and related parts disassembly /assembly ▪ Crankshaft and camshaft timing ▪ Value clearance adjustments ▪ Cylinder head assembly cylinder head gaskets 	
4.	Transmission	<ul style="list-style-type: none"> ▪ Clutch disassembly \assembly and adjustments ▪ Gear box disassembly \assembly ▪ Drive shaft disassembly \assembly ▪ Final drive disassembly \assembly 	
5.	Suspension system and steering system	<ul style="list-style-type: none"> ▪ Suspension system components assembly / disassembly ▪ Steering system components assembly /disassembly 	
6.	Brake system	<ul style="list-style-type: none"> ▪ Brake system components disassembly \ assembly ▪ Tires disassembly \ assembly 	

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



Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	
	Reports	30%	
	Final Exam	50%	

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialty	Common
Course Number	20210221
Course Title	Automotive Electricity and Electronics
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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



Brief Course Description:

- ❖ Introduction, battery, starting system, charging system, ignition system, electronic fuel injection system, lights, safety and signaling, driver information and control devises, wiring harnesses, instrument panel, (CANbus) technology for automotive application.

Course Objectives:

1. Explain electricity in terms of electrons.
2. Define voltage, current and resistance and explain how they are related.
3. Explain the basic operation of diodes and transistors.
4. Studying the battery and stating, charging, fuel injection, and electronics system.
5. Describe Ram. Rom and Prom and explain how the ECM controls engine operation.
6. Studying the sensors reporting to the ECM and can bus for automotive.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Electricity and electronic control	<ul style="list-style-type: none"> ▪ Electricity and the engine ▪ Electricity and electric current ▪ Electrical charges ▪ Measuring electricity ▪ Ohm's law ▪ Introduction to electronics ▪ Semiconductors, diodes, transistor ▪ Electronic control module (ECM) ▪ Microprocessor, memory ▪ Electronic engine control 	
2.	Battery construction	<ul style="list-style-type: none"> ▪ Battery operation ▪ Chemicals in battery ▪ Connecting cells ▪ Battery rating ▪ Battery efficiency ▪ Variations in thermal voltage 	
3.	Starting system	<ul style="list-style-type: none"> ▪ Need for starting system ▪ Basic motor principles ▪ Starting motor construction and operation ▪ Starting motor drive ▪ Overrunning the overrunning clutch 	
4.	Charging system	<ul style="list-style-type: none"> ▪ Purpose of charging system ▪ Alternator operation ▪ Alternator principles ▪ Alternator regulator ▪ Alternator terminal ▪ Alternator cooling 	
5.	Ignition system contact point	<ul style="list-style-type: none"> ▪ Purpose of ignition system ▪ Components in contact point ignition system ▪ Producing the spark ▪ Contact point ▪ Primary resistance 	

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

		<ul style="list-style-type: none"> ▪ Secondary voltage ▪ Advancing the spark ▪ Centrifugal advance ▪ Vacuum advance ▪ Spark plugs and heat range and reach ▪ Ignition switch 	
6.	Electronic ignition systems	<ul style="list-style-type: none"> ▪ Type of electronic systems ▪ Fundamental of electronic ignition ▪ Pickup-coil voltage pulse ▪ High-energy ignition system ▪ Electronic spark advance ▪ Hall-effect switch ▪ Optical photodiode distributor ▪ Fundamentals of distributor less ignition ▪ Multiple-coil distributor ignition ▪ Crankshaft-position sensor ▪ Camshaft-position sensor ▪ Direct multiple-coil ignition ▪ Direct capacitor discharge ignition 	
7.	Ignition system diagnosis	<ul style="list-style-type: none"> ▪ Ignition system trouble diagnosis ▪ Oscilloscope patterns ▪ Reading scope patterns ▪ Stored ignition-system trouble codes 	
8.	Lights, Safety, and signaling and driver information and control devices	<ul style="list-style-type: none"> ▪ Automotive lights ▪ Head lamps ▪ Light bulbs ▪ Head lamp switch ▪ Automotive head lamp controls ▪ Turn signal lights ▪ Computer controlled lighting ▪ Distributed lighting system ▪ Horn and horn relay ▪ Vehicle security systems ▪ Seat belts ▪ Air bags 	

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

		<ul style="list-style-type: none"> ▪ Wind shield wiper and washers ▪ Instrument panel ▪ Speedometer and odometer ▪ Other electronic and electronic devices ▪ Multiplex system ▪ Data bus network 	
9.	Electronic fuel injection systems	<ul style="list-style-type: none"> ▪ Introduction to gasoline fuel-injection systems ▪ Comparing port and throttle-body injection ▪ Air fuel metering ▪ Operation of fuel injection systems ▪ Type of fuel injection ▪ Cold-start valve ▪ Throttle-position sensor ▪ Measuring in tank-air flow ▪ Indirect measurement of air flow ▪ Main fold absolute pressure ▪ Direct measurement of air flow ▪ Air temperature sensor ▪ Coolant-temperature sensor ▪ Oxygen sensor ▪ Engine speed sensor ▪ Purpose of actuators ▪ Idle air control valve ▪ Electronic air control valve ▪ Electronic port-injection timing 	
10.	Diesel fuel-injection systems	<ul style="list-style-type: none"> ▪ Diesel engine construction operation ▪ Diesel engine characteristics ▪ Diesel fuel ▪ Cetan number ▪ Cleaning diesel fuel ▪ Diesel fuel-injection pump ▪ Rotary-distributor injection pump ▪ Distributor –pump control ▪ Mechanical governors 	

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

		<ul style="list-style-type: none">▪ Diesel electronic control system▪ Injection nozzle▪ Direct and indirect injection▪ Diesel starting procedures▪ Coolant and fuel heater▪ Vacuum pump	
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Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Assignments	10%	--/--/----
	Final Exam	50%	--/--/----

Teaching Methodology:

- ❖ Lectures and presentations

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. John Remling , Automotive Electricity, John Wikly & sons, Inc., U.S.A. 1987.
3. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Common
Course Number	20207131
Course Title	Internal Combustion Engines
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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

Brief Course Description:

- ❖ Definition and introduction to the (ICE) fundamentals of engine, operation engine types and classification, engine construction, engine measurements and performance, engine system (lubrication, cooling, fuel) Including both carburetor and electronic fuel injection system.

Course Objectives:

After studying this course student of Autotronics should be able to Know :

1. Studying types of engines.
2. Studying and operating of internal combustion engine.
3. Studying fuel used and system of engine.
4. Studying fuel in Gasoline and diesel engine.
5. The student should know about turbo charging and super charge and intercooler.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction to internal combustion engines	<ul style="list-style-type: none"> ▪ Types of (ICE) ▪ System of (ICE) ▪ Important of (ICE) in different fields ▪ Differences between (ICE) and other engine types like steam engine, electrical vehicles 	
2.	Classification of (ICE) according to	<ul style="list-style-type: none"> ▪ Number and arrangement of cylinders ▪ Valve arrangement in cylinder head ▪ Type of cooling systems ▪ Type of fuel 	
3.	Engine operation	<ul style="list-style-type: none"> ▪ Four stroke operation for Gasoline and diesel engine ▪ Engine diagram between pressure and crankshaft angles for four stroke engine (Gasoline and diesel) ▪ Engine pressure volume diagram with the relation of rpm and piston displacement for Gasoline engine ▪ Engine pressure – volume diagram for all Gasoline engine 	
4.	Piston , cylinder construction	<ul style="list-style-type: none"> ▪ Engine cylinder block types and operation ▪ Piston types and operation ▪ Piston rings types and operation ▪ Cylinder head types and operation ▪ Combustion chamber types ▪ Connecting rods, types and operation ▪ Crankshaft types and operation ▪ Vibration dampers ▪ Intake and exhaust manifolds 	
5.	Valves and valves Trains	<ul style="list-style-type: none"> ▪ Cam and cam shaft and operation ▪ Mechanical and Hydraulic valves, construction parts and cooling ▪ Springs and oil seals for valves ▪ Valve seats and types ▪ Valve lifters and types ▪ Rocker Arms ▪ Valve timing and types ▪ Engine timing gears and types 	

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

		<ul style="list-style-type: none"> ▪ Valve operation and engine timing operation 	
6.	Engine – performance measurements	<ul style="list-style-type: none"> ▪ Bore and stroke ▪ Piston displacement ▪ Top and bottom Dead centers ▪ Compression ratio (CR) and effects and increasing CR on engine operation ▪ Mean effective pressure ▪ Engine friction and indicated power out put ▪ Volumetric friction and indicated efficiency ▪ Power out put calculation ▪ Engine torque and relation with power out put and engines speed and diagrams ▪ Delivery of air-fuel mixture 	
7.	Automotive engine fuels	<ul style="list-style-type: none"> ▪ Gasoline , sources ,types and volatility ▪ Antiknock value in gasoline engine and facts effect knocking ▪ Octane No. rating, measuring, antiknock value during combustion and chemical control effectuating ▪ Types of abnormal combustion and normal combustion ▪ Diesel fuel, types, classification, volatility, and viscosity ▪ Cetane NO. and conditions effects its value ▪ Diesel fuel additives ▪ Diesel fuel combustion and conditions effect on it ▪ Detonation of diesel fuel and factors effect on it 	
8.	Gasoline engine fuel and Exhaust system	<ul style="list-style-type: none"> ▪ Purpose of fuel system ▪ Components of gasoline fuel system and operation (Tank, fuel pump, lines, carburetors , indicators and others) ▪ Components of Gasoline carburetor operation and types ▪ Carburetor cycles and systems ▪ Mechanical and electrical fuel pumps ▪ Conditions effect cerebration Fuel filters ▪ Crank case ventilation, and exhaust gas recalculation 	

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

		<ul style="list-style-type: none"> ▪ Exhaust system, muffler and exhaust pipes ▪ Exhaust gases treatment and its effect on environment 	
9.	Diesel fuel – injection systems	<ul style="list-style-type: none"> ▪ Diesel fuel – injection systems requirements ▪ Types of fuel – injection systems ▪ Cam operated 1-line plunger pump, components and operation ▪ Rotary distributor pump, components and operation ▪ Governors, types (centrifugal weights, vacuum) ▪ Automatic advance system of injection ▪ Diesel fuel injection and different factors effected by ▪ Fuel injectors- types and classifications, components and operation ▪ Diesel engine combustion chambers, types and its effect on combustion 	
10.	Engine cooling system	<ul style="list-style-type: none"> ▪ Purpose of the cooling system ▪ Types of the cooling systems (water, air) ▪ Components of water cooling system, function of each part, and explain cooling circulation in the system ▪ Operation of air cooling system ▪ Radiators types and materials ▪ Antifreeze solution ▪ Temperature indicators 	
11.	Engine lubricating systems	<ul style="list-style-type: none"> ▪ Purpose of the lubricating system ▪ Types of lubricating systems ▪ Components of lubricating system, operation of each part ▪ Oil filters, types and purpose ▪ Oil indicators 	
12.	Wangle (rotary) engines , and turbo charge engines , and increase power engine systems	<ul style="list-style-type: none"> ▪ Wangle (rotary) engines, components and operation ▪ Turbo – charges components and operation ▪ Super charge components and operation ▪ Inter cooler components and operation 	

Evaluation Strategies:

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



Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Assignments	10%	
	Final Exam	50%	

Teaching Methodology:

- ❖ Lectures and presentations

Text Books & References:

Textbook:

1. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
2. John Remling, Automotive Electricity , John Wikly & sons,Inc., U.S.A. 1987.
3. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Common
Course Number	20207132
Course Title	Internal composition Engines lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

Brief Course Description:

- ❖ Performance tests for spark and compression engines, air and fuel consumption, air fuel ratio, brake and indicated horse power, specific fuel consumption, volumetric efficiency, energy balance, variable compression ratio, engine emission, diagnostic, adjustment of engine.

Course Objectives:

After practical this course you should be able to :

1. Studying and calculate engine measurement and performance.
2. Studying and calculate engine efficiency torque and horse power.
3. Studying and training compression, firing order, timing advance. Timing valves, wheel balance.



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

Detailed Course Description:

lab Number	lab Name	lab Content	Time Needed
1.	Introduction to internal combustion engine		1
2.	Specific fuel consumption		1
3.	Specific air consumption		1
4.	Richness of mixture and excesses air		1
5.	Volumetric efficiency Heat balance		1
6.	Heat loss in cooling water		1
7.	Heat loss at engine exhaust		1
8.	Heat loss by radiation		1
9.	Engine torque, brake power, and Mechanical efficiency		1
10.	Compression pressure		1
11.	Cylinder leakage		1
12.	Timing advance test, firing order		1
13.	Timing valves adjustment and		1



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



Evaluation Strategies:

Exams		Percentage	Date
Exams	Mid Exam	20%	
	Discussion of Sheets	30%	
	Final Exam	50%	

Teaching Methodology:

Laboratory

Text Books & References:

References:

1. Introduction to Internal Combustion Engines, by Richard Stone, 3rd Edition, 1999, SAE International
2. Jack ERJAVEC, AUTOMOTIVE Technology A system Approach, Delmar. U.S.A – 2005.
3. John Remling , Automotive Electricity , John Willy & sons, Inc., U.S.A. 1987 .
4. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.



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



Engineering Program

Specialization	Common
Course Number	20209111
Course Title	Thermal Engineering
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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

Brief Course Description:

Concepts and definitions, Properties of a pure substance, Work and heat, the first law of thermodynamics, the second law of thermodynamics, Principles of heat transfer
Steady state conduction, Radiation, Heat exchangers

Detailed Course Description:

Unit	subject
1	Concepts and definitions: System, control volume, properties, state of substance, processes, cycles, specific volume, pressure, temperature scales, zeroth law of thermodynamics, units
2	Properties of a pure substance: vapor-liquid-solid phase equilibrium in a pure substance, equation of state, tables of thermodynamic properties.
3	Work and heat: definition and unites of work, work done at the moving boundary of a simple compressible system, definition and unites of heat, relation between work and heat.
4	The first law of thermodynamics: The first law for the change in state of a system ,internal energy, enthalpy, constant volume and pressure specific heats, internal energy and enthalpy and constant volume and pressure specific heats for ideal gases, the first law of thermodynamics for a control volume, the steady state, steady flow process.
5	The second law of thermodynamics: the engines and refrigerators, reversible process, cornot cycle, entropy ,entropy change of an ideal gas, ploytropic and adiabatic reversible process.
6	Principles of heat transfer: conduction heat transfer, plane wall, plane wall in series and parallel, electro analog for conduction, contact resistance, thermal conductivity, convection heat transfer, radiation heat transfer, combined heat transfer mechanisms.
7	Steady state conduction: steady one –dimensional conduction equation without generation in rectangular coordinates, cylindrical coordinates, steady one –dimensional conduction equation with generation, fins, types of fins, fin efficiency, transient conduction with negligible internal resistance.
8	Radiation: physics of radiation, black body, planks law, stefan-Boltzman law, radiation properties, kirchoff's law, gray body, shape factor, radiative exchange between black surfaces.
9	Heat exchangers: types, overall heat transfer coefficient, the log-mean temperature difference, heat exchanger effectiveness.

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

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
Homework and quizzes		10%	

Text Books :

- Fundamentals of Thermodynamics, 6th Edition Richard E. Sonntag, Claus Borgnakke and Gordon J. Van Wylen John Wiley and Sons Inc., New York, NY, 2003
- Basic heat transfer, Frank kreith and william Z.Black, Harper&row.

□ **References:**

1. Y.A. Cengel, Introduction to Thermodynamics and Heat Transfer, Irwin/McGraw- Hill, 1997.
2. Fundamentals of Engineering Thermodynamics, M. J. Moran, H. N. Shapiro 5th Ed, John Wiley & Sons, Inc., 2004, ISBN: 0-471-27471-2.
3. J.B. Jones and G.A. Hawkins, Engineering Thermodynamics, Second Edition, John Wiley & Sons, 1986
- 4.

اساسيات الديناميكا الحرارية الكلاسيكية، وايلي وسونتاغ، ترجمة مركز الكتب الاردني، الطبعة الثانية.



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



Engineering Program

Specialization	Common
Course Number	20209112
Course Title	Thermal Engineering Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

Brief Course Description:

- ❖ Pressure – Temperature relation in the saturation region; Compressor cycles and analyses; Heat pump performance; Conduction heat transfer; Radiation heat transfer; and Heat exchanger performance

Detailed Course Description:

Unit Number	Content	Time Needed
1.	Saturation Pressure- Saturation Temperature relation (Marcel Boiler)	
2.	Heat losses in Heat pump condenser	
3.	Energy balance of Heat pump	
4.	Coefficient of performance of heat pump	
5.	Air compressor polytropic work	
6.	Isothermal efficiency of reciprocating air compressor	
7.	Volumetric efficiency of reciprocating air compressor	
8.	longitudinal Condition in simple bar	
9.	radial Condition in simple bar	
10.	Conduction in composite bar	
11.	Effect of insulation on conduction heat transfer	
12.	Forced convection heat transfer	
13.	performance of parallel and counter flow heat exchangers	
14.	performance of cross flow heat exchangers	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports	30%	--/--/----
	Final Practical Exam	50%	--/--/----
Homework and Projects		10%	

Text Books & References:

Instructional Lab. Sheets



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