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# **curriculum for Technician Diploma Program**

## **in**

# **Automobile Mechanics**

# **Specialization**

The curriculum of Technician Diploma in “Automobile Mechanics” Specialization consists of (66) credit hours as follows:

No.	Field of Requirements	Credit Hours
1	Generic Skills	6
2	Employability Skills	9
3	Supportive Sciences	9
4	Specialization Skills	42
<b>Total</b>		<b>66</b>

**Curriculum for Technician Diploma Program  
in  
Automobile Mechanics Specialization**

**First: Generic Skills Requirements (6) credit hours as follows:**

Course Number	Course Title	C.H.	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
10000111	Positive Citizenship and Life Skills	3	3	0	-
10000112	Skills in English Language	3	3	0	-
<b>Total</b>		<b>6</b>	<b>6</b>	<b>0</b>	

**Second: Employability Skills Requirements (9) credit hours as follows:**

Course Number	Course Title	C.H.	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
10000121	Communication Skills in English Language	3	3	0	10000112
10000122	Small Productive Enterprises Management	3	3	0	-
10000123	Supervision and Industrial Organization	3	3	0	-
<b>Total</b>		<b>9</b>	<b>9</b>	<b>0</b>	

**Third: Supportive Sciences Requirements (9) credit hours as follows:**

Course Number	Course Title	C.H.	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
10100111	Applied Mathematics	3	3	0	-
10100121	Applied Physics	3	3	0	-
10100122	Applied Physics Laboratory	1	0	3	10100121*
10100131	AutoCAD	1	0	3	
10100141	Engineering Workshop	1	0	3	
<b>Total</b>		<b>9</b>	<b>6</b>	<b>3</b>	

\*Co-requisite

**Curriculum for Technician Diploma Certificate Program  
in  
Automobile Mechanics Specialization**

**Fourth: Specialization Skills Requirements (42) credit hours as follows:**

Course Number	Course Title	C.H.	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
10200111	Electricity and Electronics	2	2	0	
10200112	Electricity and Electronics Lab.	1	0	3	10200111*
10200131	Fluids and Hydraulic Machines	3	3	0	
10200132	Fluids and Hydraulic Machines Lab.	1	0	3	10200131*
10207111	Internal Combustion Engines	3	3	0	
10207112	Internal Combustion Engines Lab.	1	0	3	
10207121	Automobile Engineering	3	3	0	
10207122	Automobile Engineering Workshop	1	0	3	10207121*
10207121	Automobile Workshop 1	2	0	6	10207122
10207221	Automobile Workshop 2	2	0	6	10207121
10210221	Automobile Electricity and Electronics	2	2	0	10200111
10210222	Automobile Electricity Lab.	2	0	6	10210221*
10210223	Automobile Electronics Lab.	2	0	6	10210221*
10207231	Automobile Diagnosis and Maintenance	3	3	0	10207121
10207232	Automobile Diagnosis and Maintenance Workshop 1	2	0	6	10207231*
10207233	Automobile Diagnosis and Maintenance Workshop 2	1	0	3	10207232
10207241	Hybrid Electric Vehicle Technology	3	3	0	10207121
10207242	Hybrid Electric Vehicle Technology Workshop	2	0	6	10207241*
10207251	Alternative Fuels and Pollution Control	2	2	0	10207111
10207252	Alternative Fuels and Pollution Control Lab.	1	0	3	10207251*
10207291	Training	3	0		
<b>Total</b>		<b>42</b>	<b>21</b>		

## Guiding Plan for Automobile Mechanics Specialization/ Technical Diploma Program

First Semester			Second Semester		
Course No.	Course Title	C.H.	Course No.	Course Title	C.H.
10000111	Positive Citizenship and Life Skills	3	10000121	Communication Skills in English Language	3
10000112	Skills in English Language	3	10100131	AutoCAD	1
10100111	Applied Mathematics	3	10207121	Automobile Engineering	3
10100121	Applied Physics	3	10207122	Automobile Engineering Workshop	1
10100122	Applied Physics Laboratory	1	10200131	Fluids and Hydraulic Machines	3
10100141	Engineering Workshop	1	10200132	Fluids and Hydraulic Machines Lab.	1
10200111	Electricity and Electronics	2	10207111	Internal Combustion Engines	3
10200112	Electricity and Electronics Lab.	1	10207112	Internal Combustion Engines Lab.	1
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>16</b>

Third Semester			Fourth Semester		
Course No.	Course Title	C.H.	Course No.	Course Title	C.H.
10000123	Supervision and Industrial Organization	3	10000122	Small Productive Enterprises Management	3
10207121	Automobile Workshop 1	2	10207241	Hybrid Electric Vehicle Technology	3
10210221	Automobile Electricity and Electronics	2	10207242	Hybrid Electric Vehicle Technology Workshop	2
10210222	Automobile Electricity Laboratory	2	10207233	Automobile Diagnosis and Maintenance Workshop 2	1
10207231	Automobile Diagnosis and Maintenance	3	10207251	Alternative Fuels and Pollution Control	2
10207232	Automobile Diagnosis and Maintenance Workshop 1	2	10207252	Alternative Fuels and Pollution Control Lab.	1
10210223	Automobile Electronics Laboratory		10207221	Automobile Workshop 2	2
		2	10207291	Training	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>17</b>

## Brief Course Description for Automobile Mechanics Specialization

### First: Generic Skills

#### المواطنة الإيجابية ومهارات الحياة 10000111 (3: 0-3):

يوضح المساق مفهوم المواطنة ومهارات الحياة وأهميتها في اكتساب مهارات قيمه، والعمل على استخدام هذه المهارات في سعيهم للحصول على تعليم افضل ونتائج ايجابية في العمل، حيث ان المساق يراعي بناء المعرفة في الموضوعات التي يتضمنها البرنامج كما ويبني المهارة عند الشباب لاستخدامها في تطبيق المعرفة كما ويبني الثقة في قدرات الشباب على استخدام هذه المعرفة والمهارة بالاضافة الى توفير الدعم الشخصي والبيئي لتغيير السلوك من خلال تعزيز قيم المواطنة الايجابية والثقافة المجتمعية البناء والعمل المجتمعي التطوعي.

#### Skills in English Language 10000112 (3:3-0)

This is a General English Language course which aims at developing the four English Language receptive and productive Skills; Listening, Reading, Writing and Speaking, as well as providing practice for the basics of grammar and vocabulary for effective and meaningful communication inside and outside the classroom.

### Second: Employability Skills

#### Communication Skills in English Language 10000121 (3:3-0)

This is a communication skills course which aims at improving learners' oral and written communication skills by providing learners with the language needed to naturally and confidently communicate in an English speaking workplace environment and real life situations.

#### إدارة المنشآت الإنتاجية الصغيرة 10000122 (3: 0-3):

يوضح المساق مفهوم المنشآت الإنتاجية الصغيرة وأهميتها في الإقتصاد الوطني والقضاء على البطالة، وكيفية إدارتها و مواجهة التحديات التي تعترضها، وتقييم فرص نجاحها من خلال دراسة الجدوى، وآلية إدارة المشتريات والمخزون، وكيفية تمويلها وإدارة شؤونها المالية، وتقديم خدمة العملاء وكذلك الالتزام بأخلاقيات العمل، وكيفية عمل تسويق لها، والطبيعة القانونية لها وخطة العمل اللازمة للبدء بها مع التركيز على التجربة الأردنية في هذا المجال.

#### الإشراف والتنظيم الصناعي 10000123 (3: 0-3):

المنشآت الصناعية انواعها ومواصفاتها واشكالها ، اشكال التنظيم الاداري وميزاتها، دور الفني في تطوير الصناعة ودوره في التسلسل الهرمي في المؤسسة الصناعية و ادارة ظروف العمل في المنشآت الصناعية . التعرف على المخاطر وطرق

السيطرة عليها . التعرف على أجهزة ومعدات الحماية حسب المواصفات المعتمدة، اصناف الحريق معدات مكافحة، الكهرباء مخاطرها تأثيراتها على الانسان الحماية من الكهرباء والمعالجة من الصدمة الكهربائية، التعامل مع المواد الكيماوية آثارها مخاطرها وشروط التخزين،القوانين المحلية والضمان الاجنماعي.

### Third: Supportive Sciences

#### **Applied Mathematics 10100111 (3: 3-0)**

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)

#### **Applied Physics 10100121 (3: 3-0)**

Applied Physics course designed to explain the basic concepts of physics in two fields:  
1- Concepts and applications of mechanical physics including: Vectors, motion in one dimension, Laws of Motion (Newton's laws), work and energy and the linear momentum.  
2- Concepts of electricity including: electrical force, electrical field, electrical potential difference, capacitance, current and resistance.

#### **Applied Physics Laboratory 10100122 (1:0-3)**

Applied Physics Lab course is to accompany the General Physics course. Laboratory experiments will be in Mechanics and Electricity to reinforce the theoretical portion in the General Physics course.

#### **AutoCAD 10100131 (1:0-3)**

Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. geometric construction. dimensioning, free-hand sketching, object representation, orthographic drawing and projections

#### **Engineering Workshop 10100141 (1:0-3)**

Apply basic manual skills in engineering workshops: mechanical, electrical and carpentry.

### Fourth: Specialization Skills

#### **Electricity and Electronics 10200111 (2:2-0)**

Concepts and definitions, electrical circuit elements, voltage, current, resistance, capacitance and inductance, ohms law and dc circuit Calculations. Ac Circuits. Three phase circuits, transformers, and electrical machines. Basic electronic devices and circuits. Introduction to electrical protection.

**Electricity and Electronics Laboratory 10200112 (1:0-3)**

DC and AC circuits. Current and voltage measurements. Simple electronic circuits. DC and AC machines. Single-phase transformers. Protection devices and circuits.

**Fluids and Hydraulic Machines 10200131 (3:3-0)**

Fluid properties, fluid static's, fluid motion, continuity equation, momentum principle, energy principle, Fluid flow in pipes, pipe friction, introduction to Pumps, Types, Selection and application of pumps.

**Fluids and Hydraulic Machines Laboratory 10200132 (1:0-3)**

Measuring of physical properties of fluids, force on immersed plate, Jet force on plate, Bernoullis equation, Reynolds experiments, flow through orifices, and nozzle venture friction factor.

**Internal Combustion Engines 10207111 (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. 10207112 (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 10207121 (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 10207122 (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 Workshop 1 10207121 (2:0-6)**

العدد والأدوات والأجهزة المستعملة في إصلاح السيارات، وشروط السلامة والأمن الصناعي أثناء فك وتركيب وإجراء الإصلاح اللازم لمجموعة الصبابات، مجموعة المكبس، مجموعة عمود المرفق، نظام التزييت، نظام الوقود في كل من محركات البنزين والديزل، وضبط أداء عمل المحرك باستعمال الأجهزة المساعدة وكذلك استعمال أجهزة القياس المختلفة لقياس الحالة الفنية للقطع والأجزاء الداخلة في تركيب السيارات.

**Automobile Workshop 2 10207122 (2: 0-6)**

إصلاح الأنظمة المختلفة في السيارات (الفرامل، صندوق السرعات، التروس الفرعية، وصلات وأعمدة نقل الحركة الجهاز التفاضلي، المحاور الخلفية ونظام التعليق ونظام التعليق الخلفي، المحور الأمامي ونظام التعليق الأمامي) وذلك بعد فكها عن السيارة ومن ثم إعادة تركيبها على السيارة وضبط عملها مراعيًا شروط السلامة والأمن الصناعي أثناء العمل.

**Automobile Electricity and Electronics 10210221 (2: 2-0)**

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

**Automobile Electricity Lab. 10210222 (2: 0-6)**

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

**Automobile Electronics Lab. 10210223 (2: 0-6)**

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

**Automobile Diagnosis and Maintenance 10207231 (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 Workshop 1 10207232 (2: 0-6)**

Equipment 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 equipment.

**Automobile Diagnosis and Maintenance Workshop 2 10207232 (1: 0-3)**

Advanced engine performance concepts and tests. Vehicle communications, scan-tool diagnostics, advanced engine mechanical tests, diagnosing and repairing complex vehicle drivability issues.

**Hybrid Electric Vehicle Technology 10207241 (3: 3-0)**

Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion unit: Introduction to electric components used in electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Principles of Hybrid Electric Drive trains, Architectures – Electrical distribution, Hybrid control Strategies – Parallel Hybrid, Series Hybrid

**Hybrid Electric Vehicle Technology Workshop 10207242 (2: 0-6)**

Tasks related to the theoretical course.



### **Alternative Fuels and Pollution Control 10207251 (2:2-0)**

Various pollutants from SI and CI engines. Effects of pollutants on environment and human beings. Estimation of petroleum reserves. Need for alternative fuels. Potential alternative fuels (alcohols, oxygenates, hydrogen, LPG, NG, biogas, and vegetable oils), Merits and demerits of various alternative fuels. Emissions from engines and their control. Emission measuring instruments and test procedures

### **Alternative Fuels and Pollution Control Lab. 10207252 (1: 0-3)**

Principle of operation of emission measuring instruments used in engines, Measurement of CO<sub>2</sub> and CO by NDIR, hydrocarbon emission  
Chemiluminescent analyzer for NO<sub>x</sub>, Liquid and Gas chromatograph, spot sampling and continuous indication type smoke meters

### **Training 10207291 (3)**

Equivalent to (280 hours) of field training targeted to emphasize the ability of students to apply theories in the real world of the profession.

## **First: Generic Skills**

### **المواطنة الإيجابية ومهارات الحياة 10000111 (3 : 0-3):**

يوضح المساق مفهوم المواطنة ومهارات الحياة وأهميتهما في اكتساب مهارات قيمه، والعمل على استخدام هذه المهارات في سعيهم للحصول على تعليم افضل ونتائج ايجابية في العمل، حيث ان المساق يراعي بناء المعرفة في الموضوعات التي يتضمنها البرنامج كما ويبني المهارة عند الشباب لاستخدامها في تطبيق المعرفة كما ويبني الثقة في قدرات الشباب على استخدام هذه المعرفة والمهارة بالاضافه الى توفير الدعم الشخصي والبيئي لتغيير السلوك من خلال تعزيز قيم المواطنة الايجابية والثقافة المجتمعية البناء والعمل المجتمعي التطوعي.

### **Skills in English Language 10000112 (3:3-0)**

This is a General English Language course which aims at developing the four English Language receptive and productive Skills; Listening, Reading, Writing and Speaking, as well as providing practice for the basics of grammar and vocabulary for effective and meaningful communication inside and outside the classroom.

## **Second: Employability Skills**

### Communication Skills in English Language 10000121 (3:3-0)

This is a communication skills course which aims at improving learners' oral and written communication skills by providing learners with the language needed to naturally and confidently communicate in an English speaking workplace environment and real life situations.

### إدارة المنشآت الإنتاجية الصغيرة 10000122 (0-3:3)

يوضح المساق مفهوم المنشآت الإنتاجية الصغيرة وأهميتها في الإقتصاد الوطني والقضاء على البطالة، وكيفية إدارتها و مواجهة التحديات التي تعترضها، وتقييم فرص نجاحها من خلال دراسة الجدوى، وآلية إدارة المشتريات والمخزون، وكيفية تمويلها وإدارة شؤونها المالية، وتقديم خدمة العملاء وكذلك الالتزام بأخلاقيات العمل، وكيفية عمل تسويق لها، والطبيعة القانونية لها وخطة العمل اللازمة للبدء بها مع التركيز على التجربة الأردنية في هذا المجال.

### الإشراف والتنظيم الصناعي 10000123 (0-3:3)

المنشآت الصناعية أنواعها ومواصفاتها وأشكالها ، أشكال التنظيم الإداري وميزاتها، دور الفني في تطوير الصناعة ودوره في التسلسل الهرمي في المؤسسة الصناعية و ادارة ظروف العمل في المنشآت الصناعية . التعرف على المخاطر وطرق السيطرة عليها . التعرف على أجهزة ومعدات الحماية حسب المواصفات المعتمدة ، اصناف الحريق معدات المكافحة، الكهرباء مخاطرها تأثيراتها على الانسان الحماية من الكهرباء والمعالجة من الصدمة الكهربائية، التعامل مع المواد الكيماوية آثارها مخاطرها وشروط التخزين،القوانين المحلية والضمان الاجتماعي.

### Third: Supportive Sciences

#### Applied Mathematics 10100111(3: 3-0)

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)

#### Applied Physics 10100121 (3: 3-0)

Applied Physics course designed to explain the basic concepts of physics in two fields:  
1- Concepts and applications of mechanical physics including: Vectors, motion in one dimension, Laws of Motion (Newton's laws), work and energy and the linear momentum.  
2- Concepts of electricity including: electrical force, electrical field, electrical potential difference, capacitance, current and resistance.

#### Applied Physics Laboratory 10100122 (1:0-3)

Applied Physics Lab course is to accompany the General Physics course.  
Laboratory experiments will be in Mechanics and Electricity to reinforce the theoretical portion

in the General Physics course.

**AutoCAD 10100131 (1:0-3)**

Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. geometric construction. dimensioning, free –hand sketching, object representation, orthographic drawing and projections

**Engineering Workshop 10100141 (1:0-3)**

Apply basic manual skills in engineering workshops: mechanical, electrical and carpentry.

**Fourth: Specialization Skills**

**Electricity and Electronics 10200111 (2:2-0)**

Concepts and definitions, electrical circuit elements, voltage, current, resistance, capacitance and inductance, ohms law and dc circuit Calculations. Ac Circuits. Three phase circuits, transformers, and electrical machines. Basic electronic devices and circuits. Introduction to electrical protection.

**Electricity and Electronics Laboratory 10200112 (1:0-3)**

DC and AC circuits. Current and voltage measurements. Simple electronic circuits. DC and AC machines. Single-phase transformers. Protection devices and circuits.

Automobile Electrical and Electronic Systems

Batteries, Starting System, Charging System, Ignition System, Lighting Systems, Protective Circuits, Electrical-Electronic Circuits, Computer Circuits, Wiring Diagrams, Faults and Faults Detecting.

Automobile Electrical and Electronic Systems Workshop

Tasks related to the theoretical course.

Automotive Engines

Types, Construction, Operation, Maintenance and Servicing, Pistons and Cylinders, Fuel Systems, Lubrication and Cooling Systems.

Automotive Engines Lab.

Automotive Engines Workshop

**Alternative Fuels and Pollution Control**

Various pollutants from SI and CI engines. Effects of pollutants on environment and human beings. Estimation of petroleum reserves. Need for alternative fuels. Potential alternative fuels (alcohols, oxygenates, hydrogen, LPG, NG, biogas, and vegetable oils), Merits and demerits of various alternative fuels. Emissions from engines and their control. Emission measuring instruments and test procedures.

**Alternative Fuels and Pollution Control Lab.**

Principle of operation of emission measuring instruments used in engines, Measurement of CO<sub>2</sub> and CO by NDIR, hydrocarbon emission  
Chemiluminescent analyzer for NO<sub>x</sub>, Liquid and Gas chromatograph, spot sampling and continuous indication type smoke meters

**Automobile Electronic systems Diagnosis and Maintenance Workshop 10210235 (2: 0-6)**

Fuel system for Electronic Fuel Injection system (EFI), Air induction system for (EFI), Engine sensors for (EFI), Electronic control model for (EFI), Fault diagnosis for (EFI), Electronic ignition system, Variable intake manifold geometry, Turbo charging system, Emission control system

**Automobile Electricity and Electronics Workshops 10210236 (2: 0-6)**

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

**Training 10210291 (3)**

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.