
curriculum for Technician Diploma Program

in

Renewable energy technology

Specialization

The curriculum of Technician Diploma in “Renewable energy technology” 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
Total		66

Curriculum for Technician Diploma Program in Renewable Energy Technology Specialization

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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	-
Total		6	6	0	

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	-
Total		9	9	0	

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	
Total		9	6	9	

*Co-requisite

**Curriculum for Technician Diploma Certificate Program
in
Renewable Energy Technology Specialization**

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

Course Number	Course Title	C.H.	Weekly Contact Hours		Prerequisite
			Theoretic al	Practical	
10509211	Photovoltaic Energy Systems	3	3	0	10301101
10509212	Photovoltaic Energy Systems workshop	2	0	6	10509211*
10509221	Solar Thermal Systems	3	3	0	10509211
10509222	Solar Thermal Systems workshop	2	0	6	10509221*
10509231	Instrumentation and Control Technology	3	3	0	
10509232	Instrumentation and Control Technology Lab.	1	0	3	
10401101	Electronic Circuits and Devices	3	3	0	
10401102	Electronic Circuits and Devices Lab.	1	0	3	10401101*
10509241	Energy-saving technologies in buildings	3	2	3	10401101
10509251	Energy Conversion and Energy Storage	2	2	0	
10509252	Energy Conversion and Energy Storage Workshop	2	0	6	10509251*
10301101	Principles of Electrical Circuits	3	3	0	10100121*
10301102	Principles of Electrical Circuits Lab.	1	0	3	10301101*
10509161	Geothermal and Wind Energy	2	2	0	
10509162	Geothermal and Wind Energy lab.	2	0	6	10509161*
10509261	Renewable Energy Applications	2	2	0	
10509262	Renewable Energy Applications Workshop	2	0	6	10509261*
10509171	Energy and Environment	2	2	0	
10509291	Training	3	0		
Total		42	25		

**Guiding Plan for Renewable energy technology 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	10301101	Principles of Electrical Circuits	3
10100111	Applied Mathematics	3	10301102	Principles of Electrical Circuits Lab.	1
10100121	Applied Physics	3	10401101	Electronic Circuits and Devices	3
10100122	Applied Physics Laboratory	1	10401102	Electronic Circuits and Devices Lab.	1
10100131	AutoCAD	1		Energy and Environment	2
10000122	Small Productive Enterprises Management	3	10100141	Engineering Workshop	1
Total		17	Total		14

Third Semester			Fourth Semester		
Course No.	Course Title	C.H.	Course No.	Course Title	C.H.
10000123	Supervision and Industrial Organization	3	10509241	Energy-saving technologies in buildings	3
10509211	Photovoltaic Energy Systems	3	10509161	Geothermal and wind energy	3
10509212	Photovoltaic Energy Systems workshop	2	10509162	Geothermal and wind energy lab.	1
10509221	Solar Thermal Systems	3	10509261	Renewable Energy Applications	2
10509222	Solar Thermal Systems workshop	2	10509262	Renewable Energy Applications Workshop	2
10509251	Energy Conversion and Energy storage	2	10509291	Training	3
10509252	Energy Conversion and Energy storage Workshop	2	10509231	Instrumentation and Control Technology	3
			10509232	Instrumentation and Control Technology Lab.	1
Total		17	Total		18

Brief Course Description for Renewable energy technology 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 (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 انواعها ومواصفاتها وأشكالها ، 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 المكافحة، 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

Principles of electrical circuits 10301101 (3: 3-0)

Circuits and circuit elements. DC and AC current. Circuit variables: Voltage, Current, Energy, Power factor, Power, Active power, Reactive power, Apparent power. Connection of circuit elements: series, parallel and compound connections. Energy sources. Basic calculations: Equivalent resistance, impedance, current, voltage, power and energy calculations. KVL, KCL, Superposition principle. Resonance. Measurements of circuit variables.

Principles of electrical circuits Lab. 10301102 (1: 0-3)

DC and AC circuit construction and measurements. Resonance. Measuring devices

Electronic circuits and devices 10401101 (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.

<p>Electronic circuits and devises Lab 10401102 (1: 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)</p>
<p>Photovoltaic Energy Systems 10509211 (3: 3-0) The basics of photovoltaic solar radiation, types of solar cells, the work and efficiency of solar cells, solar photovoltaic energy storage, direct power generation from sun</p>
<p>Photovoltaic Energy Systems workshop 10509212 (2: 0-6) The sun's rays and optical devices, conversion of radiant energy, measurement of solar radiation. Solar cell characterization. The efficiency of solar cells. Effect of shading, temperature, and the dust on the performance of solar cells.</p>
<p>Solar Thermal Systems 10509221 (3: 3-0) The basics of solar thermal radiation, types of solar thermal collectors, work and efficiency of solar thermal collectors, solar thermal energy storage, solar thermal power plants.</p>
<p>Solar Thermal Systems workshop 10509222 (2: 0-6) The sun's rays and thermal devices, conversion of radiant energy, measurement of solar radiation. The efficiency of solar collectors. Effect of shading, temperature, and the dust on the performance of solar thermal collectors.</p>
<p>Instrumentation and Control Technology 10509231 (3: 3-0) Concepts of control system, control loops, block diagram, measurements and control of temperature, pressure, flow rate, level and humidity, pneumatic control, fluidic control, electric and electronic control, control actions, overloads, relays and defrost timers</p>
<p>Instrumentation and Control Technology Lab. 10509232 (1: 0-3) Measuring and control elements, Temperature, pressure, flow rate and humidity measurement and control, Control system of cooling, heating and A/C processes, Adjustment. Monitoring & troubleshooting</p>
<p>Energy-saving technologies in buildings 10509241 (3: 2-3) Teaches the principles of building energy audit techniques to include diagnostic software. During the course the student will perform an energy audit. As a result of the audit, the student will be able to recommend application of the most appropriate energy-saving treatments such as insulation, windows, appliances and HVAC equipment</p>
<p>Energy Conversion and Energy Storage 10509251 (2: 2-0) Forms of energy, energy storage methods, design and efficiency of energy storage systems, power transmission networks, design and energy-efficient transport networks, an economic study of the storage systems and energy transmission.</p>
<p>Energy Conversion and Energy Storage Workshop 10509252 (2: 0-6) Selected experiments include the investigation of the possibility of utilizing different types of batteries to store energy, and how to keep energy conversion and transmission process efficient</p>

Geothermal and Wind Energy 10509161 (2: 2-0)

Basics of geothermal energy, geothermal energy resources. Geothermal heat flow mechanisms. Heat exchange in geothermal plants: binary, flash, dual flash, and the total flow systems. Geothermal energy applications in power generation systems and heating and cooling. Introduction to wind energy , Wind Characteristics: wind Power ; wind shear; power potential ; direction ; duration curve ; turbulence , Wind Resource , wind measurements, wind map. Wind Turbines , Wind Power Systems , Design of Wind Turbines , wind power plant performance, sitting of wind power plants , Applications and Wind Industry , Economics of wind turbines.

Geothermal and Wind Energy lab. 10509162 (2: 0-6)

Investigates the basics of aerodynamic characteristics of wind, dynamic behavior of wind turbine rotors and the generated wind energy. Investigates the basics of Geothermal Energy, behavior of Geothermal Energy and the generated of Geothermal Energy.

Renewable Energy Applications 10509261 (2: 2-0)

Solar Thermal Energy Application: Solar water heaters , Solar Cooker, Parabolic concentrating solar Heating Ventilation Air Conditioning system Solar Electricity Generation :Lighting vehicles and satellites, lighting and visual guidance and steering and monitoring devices, communications and receiving stations, the protection of oil and natural gas pipelines from metal corrosion, refrigerators for mobile in cities and remote areas to provide medicine, food and drinking, agriculture and industry, warning of civil and military hardware in the lighting and electrification of the metal fence, the production hydrogen , Wind electric generators, Bio Energy Application, Hydro Energy Application, Geothermal Application,

Renewable Energy Applications Workshop 10509262 (2: 0-6)

Designs and tests integrated renewable energy applications studied by the student.

Training 10509291 (3)

Equivalent to 8 weeks of field training targeted to emphasize the ability of students to apply the theories in the real world of the profession