Curriculum for Associate Degree Program in Electrical Power Systems

The curriculum of associate degree in **"Electrical power systems"** 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 Electrical Power Systems

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

Course No.		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 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*
20304112	Electrical Machines 1	2	2	-	20301113*
20304113	Electrical Machines 2	2	2	-	20304112
20304114	Electrical Machines Laboratory	1	-	3	20304113* or 2030411*
20304221	Electrical Power Plants	3	3	-	20304113*
20304231	Transmission and Distribution Networks	3	3	-	20304221*
20304232	Transmission and Distribution Networks Laboratory	1	-	3	20304231*
20304241	Protection and Control devices	2	2	-	-
20304242	Protection and Control devices Laboratory	1	0	3	20304241*
20304243	Electrical Protection systems	3	3	-	20304241
20304244	Electrical Protection Systems Laboratory	1	-	3	20304243*
20304251	High Voltage Technology	3	3	-	20304231
20304161	Electrical Measurements	2	2	-	20304231*
20304162	Electrical Measurements Laboratory	1	-	3	20304161*
20307213	Applications of PLCs	3	3	0	20403111
20307214	Applications of PLCs Laboratory	1	0	3	20307213*
20304291	Training**	3	0		-
20304292	Project	3	0		-
Total		**43**	**29**	**24**	

*- Co-requisite

** Equivalent to 280 training hours

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Al-Balqa' Applied University

جامعة البلقاء التطبيقية

تأسست عام 1997

Study Plan for Associate Degree
in
Electrical Power Systems

First Year					
First Semester			**Second Semester**		
Course ID	**Course Name**	**Credit Hours**	**Course ID**	**Course Name**	**Credit Hours**
22002101	English Language	3	22001101	Arabic Language	3
20201111	Engineering Workshops	1	20204111	AutoCAD	2
21301111	General Mathematics	3	20506111	Occupational Safety	2
21302111	General Physics	3	20201121	Engineering Materials	2
21302112	General Physics Lab.	1	21702101	Computer Skills	3
20301113	Electrical Circuits	3	20403111	Electronics	3
20301114	Electrical circuits Lab	1	20403112	Electronics Lab	1
21901100	Islamic Culture	3	20304161	. Electrical Measurements	2
Total		**18**	**Total**		**18**

Second Year					
Third Semester			**Fourth Semester**		
Course ID	**Course Name**	**Credit Hours**	**Course ID**	**Course Name**	**Credit Hours**
20304241	Protection and Control Devices	2	20304243	Electrical Protection Systems	3
20304162	Electrical Measurements Lab.	1	20304244	Electrical Protection Systems Lab.	1
20307213	Applications of PLCs	3	20304113	Electrical Machines 2	2
20307214	Applications of PLCs Lab.	1	20304291	Training	3
21702111	Communication Skills and Technical Writing	3	20304292	Project	3
20304251	High Voltage Technology	3	20304242	Protection and Control Devices Lab.	1
20304221	Electrical Power Plants	3	20304231	Transmission and Distribution Networks	3
20304112	Electrical Machines 1	2	20304232	Transmission and Distribution Networks Lab.	1
			20304114	Electrical Machines Lab.	1
Total		**18**	**Total**		**18**

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

Brief Course Description

University Requirements

Course Title	Course No	Credit Hours (Theoretical /Practical)
Arabic Language	**22001101**	**3 (3-0)**

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 وتذوقها وتحليلها تحليلا أدبيا؛ تنمية الذوق الجمالي لــدى الطــلاب الدارسين.

English Language	**22002101**	**3 (3-0)**

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.

Islamic Culture	**21901100**	**3 (3-0)**

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 والآداب الشرعية في إطار الثقافة الإسلامية.

8. النظم الإسلامية.

Computer Skills	**21702101**	**3 (1-4)**

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.

❖ **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: Rolls 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.

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.	20301112	1 (0-3)

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	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).

Electrical Power Plants	20304221	3 (3-0)

This course covers the construction and operation of, Steam power stations, gaseous power stations, hydraulic power stations, renewable power stations, solar energy stations & wind stations.

Transmission and Distribution Networks	20304231	

Calculation of network parameters "R ,L ,C" for 1- phase and 3-phase networks ,equivalent circuits for transmission lines ,representation of lines ,types of conductors and cables , calculation of power voltage drop, efficiency and voltage regulation. Towers, insulators, D.C. and AC distribution networks, Substations, types, equipments and devices.

Transmission and Distribution Networks Lab.	20304232	

Experiments on different types of transmission and distribution lines.

Electrical Machines 1	20304112	2 (2-0)

This course covers, constructional features, principles of operation, classification, equivalent circuits, parameters evaluation, characteristics, testing & applications of DC machines & transformers.

Electrical Machines 2	20304113	2 (2-0)

This course covers constructional features, principles of operation, classification, equivalent circuits, Parameters evaluation, characteristics, testing & applications of induction & synchronous machines.

Electrical Machines Lab.	20304114	1 (0-3)

This course focus ,on connection of various types of electrical machines , measurement of losses and efficiency ,speed control and mechanical characteristics of types of motors ,external characteristics of generators.

Electrical Measurements	20304161	2 (2-0)

This course provides an introduction to Measurements science; and you will study: Electrical quantities, classifications of electrical and electronic instruments, *DC & AC* measuring instruments, bridges, electronic and digital measuring instruments, oscilloscope, recording instruments, power energy

Electrical Measurements Lab.	20304162	1 (0-3)

Experiments have to cover: measurements errors, measurements in DC & AC circuits, load effects, using electronic and digital instruments, calibration and power measurements

High Voltage Technology	20304251	3 (3-0)

Types of insulators, main concepts in breakdown, conduction and breakdown in different types of insulators, applications of insulating, over voltages, lightning arrestors.

Protection and Control devices	20304241	2 (2-0)

Basic concepts and definitions. Normal and up-normal operating conditions. Faults and their causes. Protection. Protection devices: classification, applications, basic structure and principle of operation, characteristics. Ratings of protection devices, troubleshooting and calibration. Selection of protection devices.

Protection and Control devices Lab.	20304242	1 (0-3)

The course aims at giving the students practical skills in order to select ,wire troubleshoot and maintain the most common control and protection devices like fuses ,circuit breakers , relays contactors ,timers ,switches ,and measuring transformers

Electrical Protection Systems	20304243	3 (3-0)

This course throws light on, Representation of electrical power systems, fault calculations and analysis; protective relays; electromagnetic, static and digital; over current; differential & distance protection; feeders and network protection, protection of generators, motors, transformers and bus bars.

Electrical Protection Systems Lab.	20304244	1 (0-3)

This course covers experiments on ,fuses, circuit breakers, relays, operation and application of electromagnetic relays ,electronic relays ,distance relays ,differential relays ,timers , mechanical thermal , mercury ,electronic types & contactors.

Applications of PLCs	20307213	3 (3-0)

Numbering systems. Logic circuits. Conversion of control actions and algorithms into Boolean equations and logic circuits. Introduction to PLCs and their applications. Examples of control circuits. PLCs programming. Main functions. Timers, counters. Use of PLCs in control.

Applications of PLCs Lab.	20307214	1 (0-3)

Basic components and structure of PLC. Programming. Conversion of conventional control circuits into logic circuits. Motor control using PLCs.

Training	20304291	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	20304292	3

An integrated assembly/design practical work related to the major fields of study.