Modules Catalogue | 2023-2024 | دليل المواد الدراسية

University of Anbar

جامعة الأنبار

First Cycle – Bachelor's Degree (B.Sc.) - Electrical Engineering

بكالوريوس – هندسة كهربائية

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Electrical Engineering to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة الكهربائية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Level:UG1: Semester 1

Module 1

Code	Course/Module Title	ECTS	Semester
ENG003	Calculus I	6	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	87
Description			

This course provides a comprehensive guide and up-to-date treatment of engineering mathematics with an in-depth overview of the many mathematical. It is intended to introduce students of engineering, physics, mathematics, computer science, and related fields to those areas of applied mathematics that are most relevant for solving practical problems.

Module 2

Code	Course/Module Title	ECTS	Semester
ENG002	Chemistry	5	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 2 / 0 / 0 / 0	78	47
Description			

Chemistry and Measurement and significant figures. Atoms, molecules and ions. Formulas and names. Stoichiometry and chemical calculations. Chemical reactions. Thermochemistry and enthalpy changes. Quantum theory of the atom and electron configuration. Chemical bonding and molecular geometry. The Lab. Section presents Safety in the Lab. Measurement of mass, volume and density. Identification of an unknown compound. Qualitative analysis of anions. Empirical formula of a compound. Thermal decomposition of hydrates. Stoichiometric determination. Acidbase and redox titrations. Enthalpy of reactions.

Module 3

Code	Course/Module Title	ECTS	Semester
ENG007	Engineering Drawing	6	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 2 / 0	93	57
Description			
This course discusses the fundamental concepts of engineering graphics. It gives also an introduction to computer graphics using CAD software. The following topics are covered: Drawing conventions such as standards, line types and dimensioning; drawing of inclined and curved surfaces; deducting the orthographic views from a pictorial; drawing full and half sections; deducting an orthographic view from given two views; pictorial sketching (isometric and oblique).			

Module 4

Code	Course/Module Title	ECTS	Semester
ENG005	Fundamentals of Electrical Engineering I	6	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	72
Description			
This course introduces the basics of electric circuits, series and parallel connection, and DC circuit analysis. Additionally, the course presents ohms law, Kirchhoff laws for solving series parallel circuits. Furthermore, it introduces circuit theorem and their analysis; including mesh, nodal, and superposition theorems. Thevenin and Norton theorems are also included. Finally, the course introduces capacitors and inductor into the circuit and how to deal with it under DC condition..			

Module 5

Code	Course/Module Title	ECTS	Semester
UOA005	Human Rights and Democracy	2	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 0 / 0	33	17
Description			
This course is designed to give the student the definition of freedom democracy, the concept of democracy, history of democracy, the properties of democracy, traditional Greek democracy, its principles, modern democracy, and pressure groups. This course is designed to give the student the definition of freedom and the right language and idiomatically and legitimacy of the user, Origin of the right in the eyes of Islamic law, Elements of the right and types of, Personal freedom, Intellectual freedom, Rights and economic freedoms, Islam and Slavery, Human rights objectives, The use of freedom and the right general project, The right of a Muslim to his Muslim brother, Parental rights, Right neighbor, The right of women, Human rights in the heavenly religions, Religious tolerance in Islam.			

Module 6

Code	Course/Module Title	ECTS	Semester

ENG001	Physics	5	1
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 2 / 0 / 0 / 0	78	47
Description			

This is the first course in the two-semester sequence of calculus-based introductory physics courses designed to meet the needs of student majoring in Engineering. The course is a survey of the concepts, principles, methods and major findings of classical Physics .Primarily, it covers Newtonian mechanics, and thermal Physics, with topics include: Physics and measurement, Vectors, kinematics and dynamics of motion of a single particle in one and two dimensions, work and energy, system of particles, linear momentum and collisions, kinematics and dynamics of rotational motion, equilibrium of rigid bodies, and elasticity, fluid static and fluid dynamics, oscillatory motion, wave motion, and temperature and thermal equilibrium.
The subject matter of the course will be covered in The Lab-based section which presents an introduction to the methods of experimental physics emphasis is on developing student's skills in experimental techniques, data analysis, and scientific reporting of lab work. During the course students execute a series of experiments on Kinematics of motion, kinetic and potential energy, Oscillatory motion, Thermal properties of matter, and Viscosity. The course includes computer-based experiments on Classical Mechanic

Level:UG1: Semester 2

Module 7

Code	Course/Module Title	ECTS	Semester
UOA001	Arabic Language I	2	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 0 / 0	33	17
Description			

This course aims at building students' familiarity with and competence in Arabic literature in its various genres to increase their ability to appreciate literature and to develop their awareness of its concepts through the study of poetry, novel and the short story.

Module 8

Code	Course/Module Title	ECTS	Semester
ENG004	Calculus II	6	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	87
Description			

This course provides a comprehensive guide and up-to-date treatment of engineering mathematics with an in-depth overview of the many mathematical. It is intended to introduce students of engineering, physics, mathematics, computer science, and related fields to those areas of applied mathematics that are most relevant for solving practical problems.

Module 9

Code	Course/Module Title	ECTS	Semester

Code	Course/Module Title	ECTS	Semester
UOA007	Computer Science I	3	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	0 / 2 / 0 / 0 / 0	48	27
Description			

This course presents an overview of fundamental computer science topics and an introduction to computer programming. Overview topics include an introduction to computer science and its history, computer hardware, operating systems, digitization of data, computer networks, office and application.

Module 10

Code	Course/Module Title	ECTS	Semester
ELE002	Digital Techniques	5	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 0 / 0	63	62
Description			

This course introduces the student to digital fundamentals concepts, which includes: numbers systems. Codes, Types of logic gates, and Boolean expressions of different circuits. The course also examines the design of main logic circuits, along with an introduction to analysis of clocked sequential circuits. This course introduces the student to understand the Flip-flops, types of flip-flops, there logic symbols, and excitation tables of different flip-flops. The course also examines the design of main logic circuits, along with an introduction to analysis of clocked sequential circuits and the topics of sequential circuit analysis and design, PLD, and Logic families.

Module 11

Code	Course/Module Title	ECTS	Semester
ENG006	Engineering Mechanics (Static)	6	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	87
Description			

This course is an introduction to learning and applying the principles required to solve engineering mechanics problems. Concepts will be applied in this course from previous courses you have taken in basic math and physics. The course addresses the modeling and analysis of static equilibrium problems with an emphasis on real world engineering applications and problem solving.

Module 12

Code	Course/Module Title	ECTS	Semester
UOA003	English Language I	2	2
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 0 / 0	33	17
Description			

This course is designed to enable the students to achieve academic oral and written communication to the standard required at the university level. The course integrates all the language skills with emphasis on writing, and stimulates students' imagination, and promotes personal expression. Students, in this course, are trained to apply critical thinking

skills to a wide range of challenging subjects from diverse scientific topics. Course activities include writing various types of academic essays, acquiring advanced academic vocabulary, and getting involved in group discussions and debates. In addition, the course also includes other skills to consolidate the main skills, such as further readings in electrical engineering.

Module 13

Code	Course/Module Title	ECTS	Semester
ELE001	Fundamentals of Electrical Engineering II	6	2
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
3	0 / 2 / 0 / 1 / 0	93	57
Description			
Capacitors, Inductors, series and parallel connection, AC circuit analysis, sinusoidal review, complex numbers, sinusoidal circuits, impedance and admittance, series and parallel connection and phase relation in Sinusoidal Circuits, Phasor Diagram, More Sinusoidal Circuits, instantaneous, average, apparent power and power factor and reactive power, complex power and power triangle, RMS values, maximum power transfer in sinusoidal circuits. Resonance in AC Circuits, Magnetic Circuits.			

Level:UG2: Semester 3

Module 13

Code	Course/Module Title	ECTS	Semester
UOA002	Arabic Language II	2	3
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 0 / 0 / 0 / 0	30	20
Description			
0			

Module 14

Code	Course/Module Title	ECTS	Semester
ENG008	Calculus III	6	3
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
3	0 / 0 / 0 / 1 / 0	63	87
Description			
Advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem.			

Module 15

Code	Course/Module Title	ECTS	Semester
UOA006	Crimes of Baath Party	2	3
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 0 / 0 / 0 / 0	33	17

Description			
0			

Module 16

Code	Course/Module Title	ECTS	Semester
ELE015	DC Machines I	4	3
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	22
Description			
This course is designed to enable the students to understand the DC machines as a required at department level. The course integrates the Generator-principle of rotating electrical machines and calculation of induced e.m.f., energy, power and torque in DC machines. Construction of DC machines and function of commutator. Type of armature windings. Calculation of m.m.f. per pole. Type of excitation connections. Armature reaction. Commutation.			

Module 17

Code	Course/Module Title	ECTS	Semester
ELE003	Electric Circuits I	5	3
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	62
Description			
This course is a first course on electric circuits. The course is designed to provide students with an importance for electrical engineering field: Natural and Step Response of RL and RC Circuits, Sequential Switching; Natural and Step Response of Parallel and Series RLC Circuits. Operation Amplifiers. Balanced Three-Phase Circuits, Analysis of circuits (Wye, Delta); Power Calculations. Unbalanced Three-Phase systems.			

Module 18

Code	Course/Module Title	ECTS	Semester
ELE005	Electromagnetic Fields I	5	3
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	77
Description			
This course is designed for students to understand vector analysis, Coulomb's law and electric field intensity, Electric flux density, Gauss's law and divergence, Energy and potential.			

Module 19

Code	Course/Module Title	ECTS	Semester
UOA004	English Language II	2	3
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 0 / 0	30	20
Description			
0			

Module 20

Code	Course/Module Title	ECTS	Semester
ELE007	Fundamentals of Electronics I	4	3
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	22
Description			
Semiconductor Materials and PN Junction: Forward biased, Reversed biased, and I-V Relationship. Diode and Zener diode circuits: DC analysis, models and applications. Bipolar junction transistor. Transistor Structure, and I-V Relationship. DC-Biasing BJT and Basic transistor applications: Switch, Digital Logic, etc. Field Effect Transistors (FETs): Structure and Operation of JFET P-Channel, N-Channel, Enhancement-Mode, Depletion-Mode MOSFETs.			

Level:UG2: Semester 4

Module 19

Code	Course/Module Title	ECTS	Semester
ENG009	Calculus IV	6	4
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	87
Description			
Differential Equations, begins with some definitions and terminology and mathematical models used in a differential equations course. First-order and higher-order differential equations, along with the methods of solutions and their applications are introduced. Modeling with higher-order, Laplace transform, and systems of linear first-order differential equations are covered. At the end, students learn series solutions of linear equations. Numerical methods are covered throughout the course. This course focuses on differential equations and their applications in science and engineering.			

Module 20

Code	Course/Module Title	ECTS	Semester
UOA008	Computer Science II	3	4
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	0 / 2 / 0 / 0 / 0	45	30
Description			
0			

Module 21

Code	Course/Module Title	ECTS	Semester
ELE016	DC Machines II	4	4
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	22
Description			

This course is designed to enable the students to understand the DC machines as a required at department level. The course integrates the Losses and efficiency of D.C. generators. Type and characteristic of D.C. generator. Parallel operation of D.C. generators. Motors-principle of operation of D.C. motors. Calculation of speed, torque, starting of D.C. motors, characteristic (shunt, series, compound, separately), speed control, electric breaking. Brush less DC motor.

Module 22

Code	Course/Module Title	ECTS	Semester
ELE004	Electric Circuits II	4	4
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
3	0 / 0 / 0 / 1 / 0	63	37
Description			

This course is a second course on electric circuits. The focus of the course is to impart useful skills on the students to enhance their circuit analysis capability. Hence, the course is designed to provide students with a knowledge on circuit analysis by Introducing the topic and illustrating its importance for electrical engineering field: Laplace transform and relation between current and voltage for resistance, capacitance and inductance, Laplace transform and its applications in electric circuit the concept of magnetic coupling, Analysis of magnetic coupled circuits, Linear transformers, Ideal transformers. Two-port networks and its different equation forms, Evaluation of its parameter, Interconnected two-port networks, Frequency response. High-pass, low-pass, Band pass, and Band-stop filters. Revision and a set of solved examples.

Module 23

Code	Course/Module Title	ECTS	Semester
ELE006	Electromagnetic Fields II	5	4
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 0 / 0 / 1 / 0	48	77
Description			

This course is designed for students to understand current and conductors dielectrics and capacitance, Poisson's and Laplace's equations, the steady magnetic field, Magnetic forces, materials and inductance, Time-varying fields and Maxwell's equations.

Module 24

Code	Course/Module Title	ECTS	Semester
ENG010	Engineering Statistics	4	4
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
3	0 / 0 / 0 / 0 / 0	48	52
Description			

Statistical Engineering models are based on mathematics and probability theory. This course provides students with a working knowledge of fundamental statistics principles and probability in addition to a preface to the regression and correlation analysis. By the end of the semester, students should be able to determine when each of the various topics we have covered is appropriate to use, and to apply them to practical engineering situations or problems. This course will cover techniques on data collection and presentation,

descriptive statistics, basic elements of probability theory, sampling techniques and theory, statistical estimation, hypothesis testing and regression analysis.	

Module 25

Code	Course/Module Title	ECTS	Semester
ELE008	Fundamentals of Electronics II	4	4
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	22
Description			
small signal analysis of BJT circuits of transistor. Field effect Transistor (JFET), DC and small signal analysis of JFET circuits, MOSFETs, DC circuit analysis of Depletion and Enhancement MOSFETs and JFETs. Basic MOSFET applications, Switch, Digital Logic Gates, and Amplifiers.			

Level:UG3: Semester 5

Module 25

Code	Course/Module Title	ECTS	Semester
ELE020	Computer Networks	4	5
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	52
Description			
This course presents an overview of fundamental computer science topics and an introduction to computer programming. Overview topics include an introduction to computer science and its history, computer hardware, operating systems, digitization of data, computer networks, office and application.			

Module 26

Code	Course/Module Title	ECTS	Semester
ELE017	AC Machines I	5	5
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	47
Description			
This course is designed to enable the students to understand the AC machines especially induction motors to the standard required at department level. The course integrates Introduction of AC machines construction and operation principle for students of the third year in electrical engineering department. Students, in this course, will deals with single phase induction machine, equivalent circuit, three phase induction machines etc. Theoretical preparation of students to work in the field of electrical machine design, operation, fault detection and control. Applying numerical method to solve industrial problem.			

Module 27

Code	Course/Module Title	ECTS	Semester
ELE013	Analog Communications and Noise	4	5

Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 0 / 0 / 1 / 0	48	52
Description			
This course introduces the fundamentals of communication system engineering. Specifically, the analog communication systems (AM and FM). The noise within the communication systems is also introduced.			

Module 28

Code	Course/Module Title	ECTS	Semester
ELE021	Electric Power I	5	5
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	77
Description			
This course is designed to introduce elements of power system, generation unit, thermal plants, Hydro plants, Steam plants, nuclear plants. Explain principle of Load factor, capacity factor, transmission line constants, resistance, inductance, single phase two wire, three phase, symmetrical distance, unsymmetrical distance, flat arrangement, horizontal arrangement, hexagonal arrangement. Give an overview of Capacitance, single phase two wire, three phase, symmetrical distance, unsymmetrical distance, flat arrangement, horizontal arrangement, earth effect. Performance design of T.L, short T.L, equivalent circuit, voltage regulation, phasor diagram, Medium T.L, equivalent circuit, voltage regulation, phasor diagram, T model, pi model, Long T.L, equivalent circuit, voltage regulation, phasor diagram.			

Module 29

Code	Course/Module Title	ECTS	Semester
ELE009	Electronics I	5	5
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	47
Description			
Multistage and compound Configurations, Amplifier frequency response. Differential amplifier, Application to CMOS and BIMOS circuits, Operational amplifier Characteristics, Op -Amp applications: Constant-Gain Multiplier, Voltage Summing, Voltage Buffer, Controlled Sources, Comparator, Log and antilog amplifiers, Active Filters.			

Module 30

Code	Course/Module Title	ECTS	Semester
ELE011	Engineering Analysis I	7	5
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	112
Description			
This course introduces the fundamentals of the continuous Engineering Analysis. It studies the linear time-invariant (LTI) systems and their impulse response, convolution, and correlation. The Fourier transform, and series of continuous Engineering Analysis are also studied. The course teaches the frequency response and its applications in the electrical			

systems and signals communication. The types and designs of analog filters in Fourier domain are presented.	

Module 31

Code	Course/Module Title	ECTS	Semester
ELE019	Computer Programming	4	6
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
1	0 / 2 / 0 / 0 / 0	48	52
Description			

This course provides introduction to MATLAB. It is designed to give students fluency in MATLAB, including popular toolboxes. Programming in MATLAB includes input and output of data, algebraic and logical expressions and operators, hierarchy of precedence of operations, all data types including complex numbers and strings, structured and cell arrays, array indexing and array operations, matrices and matrix operations, control structures, loops, script and function m-files, function handles and their use, graphics and plots. Applications of MATLAB to solutions of engineering problems include solutions of systems of linear equations. Introduction to Simulink.

Module 32

Code	Course/Module Title	ECTS	Semester
ELE018	AC Machines II	5	6
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 2 / 0 / 1 / 0	78	47
Description			

This course is designed to enable the students to understanding synchronous machines and transformers to the standard required at department level. The course integrates Introduction of SG and SM definition of all types, operation and control of Synchronous machines and transformer for students of the third year in electrical engineering department. Students, in this course, will deals with operation principle of synchronous generator, equivalent circuit of SG and efficiency calculation. Study motor operation mode and its equivalent circuit. Efficiency calculation of SM, starting and stopping of SM. introduction of transformers and its several types. Power transformer and distribution transformer.

Module 33

Code	Course/Module Title	ECTS	Semester
ELE014	Digital Communications	5	6
Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 2 / 0 / 1 / 0	78	47
Description			

This course introduces the fundamentals of the digital communication systems. It discusses different techniques of transmitting analog signals in form of discrete/binary signals. Different carrier modulation methods of the binary data are presented.

Module 34

Code	Course/Module Title	ECTS	Semester
ELE022	Electric Power II	5	6
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	77
Description			
This course is designed to introduce the 2-port network, ABCD constants, power circle diagram, power flow through T.L. Give an overview of Overhead T.L insulators, string insulators, voltage distribution, and corona. Explain Sag and stress calculations, parabola equation, effect of ice and wind, different level supports, economic operation, and underground cables.			

Module 35

Code	Course/Module Title	ECTS	Semester
ELE010	Electronics II	5	6
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	47
Description			
Power Amplifiers: Definitions and Amplifier Types. Feedback Circuits: Feedback Concepts, Feedback Connection Types. Linear Oscillators: Basic Principles of Sinusoidal Oscillators, Positive Feedback and Oscillation, The Oscillation Criterion. RC Oscillator: RC Phase-Shift Oscillator and Wien-Bridge Oscillator. LC and Crystal Oscillator. Non-Sinusoidal Oscillators and Tim Circuits. Wave shaping of function generator, Monostable Multi-vibrator, Astable Multi-vibrator. Power Supplies (Voltage Regulators) and Practical Applications.			

Module 36

Code	Course/Module Title	ECTS	Semester
ELE012	Engineering Analysis II	6	6
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 0 / 0 / 1 / 0	63	87
Description			
This course introduces the fundamentals of the discrete Engineering Analysis. It studies the linear time-invariant (LTI) discrete systems and their impulse response, convolution, and correlation. The Fourier transform, and series of discrete Engineering Analysis are also studied. The course introduces the z-Transform and its applications in the electrical systems and signals communication.			

Level:UG4: Semester 7

Module 37

Code	Course/Module Title	ECTS	Semester
ELE025	Control Theory I	6	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	72

Description			

This course gives the students a theoretical foundation for understanding feedback control system analysis it Introduce basic techniques for analysis and design of feedback control systems. It gives a definition about control theory and a comparison between open loop and closed loop systems, derivation of transfer function and making a mathematical representation for various types of physical systems, block diagram formulation and reduction, signal flow graph formula. The course enables the student to know test input signals and transit response analysis for first, second and higher order systems, error analysis and stability theorem in s domain using Routh-hurtize criteria.

Module 38

Code	Course/Module Title	ECTS	Semester
ELE023	Electric Power III	6	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	102
Description			

This course is designed to enable the students to understand of power system analysis for students of the Fourth year in electrical engineering department. The course integrates Power system representation; Per unit system; Balanced and unbalanced faults, Symmetrical fault calculations. Symmetrical components, Unsymmetrical faults; Synchronous machine in power system; Power system load flow problems. Direct methods involving inversion of the nodal admittance matrix, iterative methods Gauss-Seidal method, Newton Raphson method;

Module 39

Code	Course/Module Title	ECTS	Semester
ENG011	Engineering Numerical Methods	5	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0 / 2 / 0 / 0 / 0	78	47
Description			

The numerical methods course involves solving engineering problems drawn from all fields of engineering. The numerical methods include: Error analysis, roots of nonlinear algebraic equations, solution of linear and transcendental simultaneous equations, matrix and vector manipulation, curve fitting and interpolation, numerical integration and differentiation, solution of ordinary and partial differential equations.

Module 40

Code	Course/Module Title	ECTS	Semester
ENG012	Ethics and Leadership Skills	2	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 0 / 0	33	17
Description			

This course is designed for engineering students who are interested in advancing into management and leadership roles. You will gain a perspective on what it is like to be an engineering leader. You will develop awareness of your own strengths and weaknesses as a leader when you are placed in charge of a project. You will learn how to leverage your strengths and control your weaknesses. You will also learn how to manage relationships

with your team members and how to set up a creative environment for your team to motivate each team member to reach his or her potential. You will also learn how to deal with different ethical issues that are related to engineering field.	

Module 41

Code	Course/Module Title	ECTS	Semester
ELE028	Final Year Project I	4	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1 / 2 / 0 / 0 / 1	63	37
Description			
0			

Module 42

Code	Course/Module Title	ECTS	Semester
ELE027	Information Theory	7	7
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	127
Description			
This course will cover the following topics: Information Presentation and Information Sources, Measures of Information, Entropy and Information, Entropy Ergodic Theorem, Information Rate, Channel modeling, Introduction to Coding, Channel Coding, Source Coding, Coding for Noisy Channels, Block Codes, Convolutional Code, Optimal Error Correction Codes			

Level:UG4: Semester 8

Module 43

Code	Course/Module Title	ECTS	Semester
ELE026	Control Theory II	6	8
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 2 / 0 / 1 / 0	78	72
Description			
This course gives the students the ability for understanding steps and procedure drawing root locus plot, and designing compensator using root locus method, frequency domain analysis including polar plot, bode plot, gain and phase margin, Nyquist stability criteria, three term controller (PD, PI, PID) controllers. The course focuses on analysis of control systems in state space and the methods of design of control system using state space approach. In the end of the course, the course introduces sampled data systems and analysis of digital control systems.			

Module 44

Code	Course/Module Title	ECTS	Semester
ELE034	Digital Electronics	5	8
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	0 / 0 / 0 / 1 / 0	48	77
Description			
This course is designed to enable the students to understand the Digital Electronics circuits. The course concerned with design and implementation of digital circuits using finite state machines (synchronous and asynchronous), Studying various types of digital to anlage (D/A) and analog to digital (A/D) convertors. Knowing the characteristics and types of different logic families, studying the construction and types of Semiconductor memories and programmable logic devices.			

Module 45

Code	Course/Module Title	ECTS	Semester
ELE029	Final Year Project II	4	8
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1 / 2 / 0 / 0 / 1	63	37
Description			
0			

Module 46

Code	Course/Module Title	ECTS	Semester
ELE024	Power Electronics	5	8
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	77
Description			
Power Semiconductor Devices: Power Diode, Thyristor, Diac, Triac, BJT Transistor, MOSFET. AC/DC converters (Rectifier), Uncontrolled and Controlled Half and Full wave Rectifier. DC/DC Convertor (Choppers), DC/AC Convertor (Inverters), AC/AC Convertor (Cyclo-converters). Static Switches.			

Module 47

Code	Course/Module Title	ECTS	Semester
ELE039	Power System Analysis	5	8
Class (hr/w)	**Lect/Lab/Pr/Tut/Sem**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0 / 0 / 0 / 1 / 0	48	77
Description			
This course is designed to enable the students to understand of power system analysis for students of the Fourth year in electrical engineering department. The course integrates Power system stability; Study of protection of power system generation, transmission and distribution. Study of important parts of system protection. explanation of grounding system. Introduction of distribution system. High voltage DC transmission system performance.			

Module 48

Code	Course/Module Title	ECTS	Semester
ELE036	Programmable Logic Controller (PLC)	5	8

Class (hr/w)	Lect/Lab/Pr/Tut/Sem	SSWL (hr/sem)	USWL (hr/w)
2	0 / 2 / 0 / 1 / 0	78	47
Description			

Understand the fundamentals Programmable Logic Controllers systems. Identify the types of PLC communications and network systems. Design, edit, test, and document PLC Ladder Logic Programs. Diagnose and troubleshoot PLCs using Rockwell's A.I. and R.S. Series software. Specify safety consideration for personnel, field devices and automated equipment.

3. Contact

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