

Northern Technical University



First Cycle – Bachelor's Degree (B.Sc.) - Medical Instrumentation Technical Engineering الكهربية تقنيات الهندسة - بكالوريوس



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1. Overview

This catalogue is about the courses (modules) given by the program of Electrical Engineering Technique to gain the Bachelor of Science degree. The program delivers (47) 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 تقنيات 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 1 Module 1

Code	Course/Module Title	ECTS	Semester
EET100	DC ELECTRICAL CIRCUITS	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57
Description			
To teach the students the various calculation in electrical circuits & Learn about different theories and covers the fundamentals of direct current (DC) electricity, including topics such as Ohm's law, Kirchhoff's laws, circuit analysis, and power calculations.			

Level 1 Module 2

Code	Course/Module Title	ECTS	Semester
EET101	Digital technology	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57
Description			
Training students on the basics of logic circuits used in electronic computers and how they work Building logical circuits and learning about computer operation, also covers the fundamentals of digital technology, including topics such as digital logic, computer architecture, programming languages, and computer networks.			

Level 1 Module 3

Code	Course/Module Title	ECTS	Semester
EET102	ENGINEERING DRAWING	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	4	63	62
Description			
<p>To explore further and confirm the reference of engineering drawing to the varied design applications found in engineering and technology in general. To further the ability to communicate information by engineering drawings. To develop knowledge to two-dimensional (2D) computer-aided draughting (CAD).</p>			

Level 1 Module 4

Code	Course/Module Title	ECTS	Semester
EET103	MATHEMATICS	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	0	93	32
Description			
<p>To teach the students: 1-Derivatives of trigonometric functions 2- Partial differentiation and Total differential 3- limit and derivative concepts 4- The Fundamental Theorem of Calculus, 5-Indefinite Integrals and the Net Change Theorem</p>			

Level 1 Module 5

Code	Course/Module Title	ECTS	Semester
EET104	ENGINEERING WORKSHOPS	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	3	48	77
Description			
<p>Providing the student with manual experience and scientific proficiency Engineering workshops is a course or module that covers the fundamentals of engineering workshops, including topics such as safety, tools, and materials.</p>			

Level 1 Module 6

Code	Course/Module Title	ECTS	Semester
EET105	ARABIC LANGUAGE	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	42
Description			
<p>تعليم أساسيات اللغة العربية، على انه علم يبحث تعليم المهارات اللغوية وتطبيقها في المحادثات اليومية والرسمية. التعامل على اساس الاقتباس ثم التعلم بهدف تطوير القابلية الذهنية للطالب. تنمية قدرة الطالب على اتقان اللغة وتحليل ظواهر الكلام. تشجيع البحث العلمي وتحسين المهارات النقاشية لدى الطالب. تنمية وتطوير المهارات الابداعية والتفكيرية والقدرة على التحليل والفهم والاستنباط في المجالات اللغوية والأدبية</p>			

Level 1 Module 7

Code	Course/Module Title	ECTS	Semester
EET106	Engineering Mechanics	7	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	0	48	127
Description			
<p>Giving the student the theoretical information that has the main role in solving technical problems in addition to the basic and prominent role in building machines and devices. As well as introducing the student to stresses and how to test materials and minerals.</p>			

Level 1 Module 8

Code	Course/Module Title	ECTS	Semester
EET107	Human Rights AND DEMOCRACY	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	67
Description			
التعرف على الحقوق المكتسبة لكل إنسان على وجه الأرض بلا تحيز أو تمييز، وبغض النظر عن عرقه، أو جنسيته، أو جنسه، أو لغته، أو دينه، وبذلك يحق لكل فرد في العالم بأن يتمتع بالحقوق الخاصة به دون أي مساس بها بما يضمن له العيش بكرامةٍ ومساواةٍ			

Level 1 Module 9

Code	Course/Module Title	ECTS	Semester
EET108	ENGLISH LANGUAGE (BEGINNER)	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	42
Description			
The student will acquire English listening skills as well as how to use extremely common everyday idioms and short sentences for immediate needs.			

Level 1 Module 10

Code	Course/Module Title	ECTS	Semester
EET109	AC ELECTRICAL CIRCUITS	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57
Description			
To teach the students to the behavior of electrical circuits(containing basic components such as resistance, coil, and capacitor) in the steady state, AC electrical circuits module covers the fundamentals of alternating current (AC) circuits, including topics such as Ohm's law, power, resonance, and transformers.			

Level 1 Module 11

Code	Course/Module Title	ECTS	Semester
EET110	PHYSICS	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
Preparing the student to study electrical and electronic physics and the properties of electrical materials and semiconductors. PHYSICS Module covers the fundamentals of physics, including topics such as mechanics, thermodynamics, electricity and magnetism, optics, and modern physics. Q:			

Level 1 Module 12

Code	Course/Module Title	ECTS	Semester
EET 111	Computer principls	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
Students will learn the principal work of computer components and how does it work, also they will learn how to use Microsoft Office program packages			

Level 2 Module 13

Code	Course/Module Title	ECTS	Semester
EET 200	DC GENERATORS	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
Students will learn the general principles of magnetism and types of winding, as well as the different types of DC motors, ways to control them, and their uses.			

Level 2 Module 14

Code	Course/Module Title	ECTS	Semester
EET201	Electronic Essentials	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
<p>Students will learn the basic components of essential electronics, studying the semiconductors material, pn junction, and applications of diode like as clipping circuits, clamper circuits, and rectifier circuits, also special purposes diodes as well as studying the BJT transistors. The Electronic Essentials module is a course that covers the fundamentals of electronics, including topics such as semiconductors, digital logic, and circuit design.</p>			

Level 2 Module 15

Code	Course/Module Title	ECTS	Semester
EET202	Electrical Circuits Analysis	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the principle of transient AC and DC circuit and design the circuits which used to power electronics, motors, and delay circuits applications.</p>			

Level 2 Module 16

Code	Course/Module Title	ECTS	Semester
EET203	Sensors	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the working principle of several sensors and recognize the key issues in selecting the right instrument, and be known with several types of actuators, and to understand modern signal transmission techniques and relevant standards, also to become aware of the sampling theorem, ADC and DAC.</p>			

Level 2 Module 17

Code	Course/Module Title	ECTS	Semester
EET 204	Applied Mathematics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	0	63	62
Description			
<p>Students will learn the principle of mathematics, lows , solve the equations and the electrical circuit.</p>			

Level 2 Module 18

Code	Course/Module Title	ECTS	Semester
EET205	Computer Applications	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the principle use of computer program, solve the function and equation using command of MATLAB program</p>			

Level 2 Module 19

Code	Course/Module Title	ECTS	Semester
EET206	DC Motors	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	72
Description			
<p>Students will learn the general principles of magnetism and types of winding, as well as the different types of DC motors, ways to control them, and their uses.</p>			

Level 2 Module 20

Code	Course/Module Title	ECTS	Semester
EET207	Electronic Circuits	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the dc biasing of BJT and FET transistor, connections, and how BJT use as operation amplifier with common emitter ,common base and common collector each separately, also the students will study the thyristor and other semiconductor devices (Diac, Triac , SCR)</p>			

Level 2 Module 21

Code	Course/Module Title	ECTS	Semester
EET208	Advanced Electrical circuit Analysis	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
<p>Students will learn the principle of transient AC circuit, Write circuit equations for coupled system and Analyze circuits containing ideal transformers</p>			

Level 2 Module 22

Code	Course/Module Title	ECTS	Semester
EET209	Instruments and Measurments	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
<p>Students will learn the basic components of measurement devices, studying errors in reading and how to reduce them, as well as an introduction method of using devices in measurements, how to choose the appropriate device, and learning about calibration of devices.</p>			

Level 2 Module 23

Code	Course/Module Title	ECTS	Semester
EET210	Engineering Analysis	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	0	63	62
Description			
To help students to understand the engineering analysis transformations in complex frequencies domains, in order to solve complicated mathematical and electrical circuits.			

Level 2 Module 24

Code	Course/Module Title	ECTS	Semester
EET211	English Language (Intermediate)	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	42
Description			
The student will acquire English tense, and grammar as well as how to use the vocabulary for forming sentences, solving the tens, and short conversations			

Level 3 Module 25

Code	Course/Module Title	ECTS	Semester
EET300	Principles OF Power Engineering	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
To teach the students the various calculation in electrical circuits & Learn about different theories.			

Level 3 Module 26

Code	Course/Module Title	ECTS	Semester
EET301	DC Power Conversions	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the principle of DC Power converters and principles of designing DC power circuits based on power electronics devices for different industrial power applications</p>			

Level 3 Module 27

Code	Course/Module Title	ECTS	Semester
EET302	Electrical Transformers And Induction Machines	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Understand AC machines of different types. 2. Learn how to use alternating current machines. 3. Learn the methods of checking and selecting these machines. 			

Level 3 Module 28

Code	Course/Module Title	ECTS	Semester
EET303	Electromagnetic Fields	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	32
Description			
<p>Learn how to deal with vectors and coordinate types, as well as how to convert between them. The study also attempts to learn about electric fields and their effects on electric charges and bodies. Magnetic Field Effects It is also feasible to discover how the electric and magnetic fields are related by studying Maxwell's equation.</p>			

Level 3 Module 29

Code	Course/Module Title	ECTS	Semester
EET 304	Microprocessor	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
To teach students about architecture, programming, hardware, and application of microprocessors.			

Level 3 Module 30

Code	Course/Module Title	ECTS	Semester
EET 305	Numerical Analysis	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	0	63	62
Description			
<p>This course is designed to achieve the following objectives:</p> <ul style="list-style-type: none"> - The objectives of studying this module are to make the students familiarize with the ways of solving complicated mathematical problems numerically. <p>Describing and understanding of the several errors and approximation in numerical methods.</p>			

Level 3 Module 31

Code	Course/Module Title	ECTS	Semester
EET 306	Advanced Power engineering	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
Students will learn the principle of transient AC and DC circuit and design the circuits which used to power electronics, motors, and delay circuits applications			

Level 3 Module 32

Code	Course/Module Title	ECTS	Semester
EET 307	AC Power conversions	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Students will learn the principle of AC Power converters and principles of designing AC power circuits based on power electronics devices for different industrial power applications</p>			

Level 3 Module 33

Code	Course/Module Title	ECTS	Semester
EET 308	Synchronous and Special Machines	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57
Description			
<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Understand AC machines of different types. 2. Learn how to use alternating current machines. 3. Learn the methods of checking and selecting these machines. 			

Level 3 Module 34

Code	Course/Module Title	ECTS	Semester
EET 309	Digital controllers	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	72
Description			
<ol style="list-style-type: none"> 1. To help the students understand the basic principles of Microcontroller based design and development 2. To help the students design and build functional prototypes for real-world applications 3. To encourage the students to better understand the state-of-the-art interfacing technologies, their potential applications, and their market views. 4. To help the students undertake problem identification, formulation, and selection of an appropriate Microcontroller 			

Level 3 Module 35

Code	Course/Module Title	ECTS	Semester
EET 310	English language(advanced)	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	42
Description			
The student will acquire English tenses, grammars as well as how to use the vocabulary for forming the sentences, solving the problems and short conversation.			

Level 3 Module 36

Code	Course/Module Title	ECTS	Semester
EET 311	Elective 1	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
The curriculum aims to introduce the student to the concept of analog communication, its types, methods of downloading signals, and the processes that take place on them, designing and analyzing them.			

Level 4 Module 37

Code	Course/Module Title	ECTS	Semester
EET 400	Transmission and Distribution Systems	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	32
Description			
Students will learn about types of transmission lines, distribution systems, the student is also taught methods of grounding and types of secondary stations			

Level 4 Module 38

Code	Course/Module Title	ECTS	Semester
EET 401	Electric Machine Drives	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	32
Description			
Students will learn the principle of AC and DC Drives and design of power electronics circuits used to drive DC and AC motors, and their applications.			

Level 4 Module 39

Code	Course/Module Title	ECTS	Semester
EET 402	Power System Analysis	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	32
Description			
Course Description: This course provides a comprehensive study of power system analysis techniques used in the planning, design, and operation of electrical power systems. Students will learn about the steady-state and dynamic behavior of power systems, including power flow analysis, and fault analysis. The course aims to equip students with the knowledge and skills necessary to analyze and solve complex power system problems.			

Level 4 Module 40

Code	Course/Module Title	ECTS	Semester
EET403	Electric Power Generation stations	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
The student will be familiar with the methods of generating electrical energy by the variance electrical stations. Each type of these station has a special method for generating electrical energy.			

Level 4 Module 41

Code	Course/Module Title	ECTS	Semester
EET404	Control System Analysis	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
<p>Students will learn the theory and practice of control system engineering with emphasis on the analysis and design of feedback system. Control systems are found in wide of applications from aircrafts to robots and process control system. Students will be able to model , design and analyze electrical systems in frequency and time domain.</p>			

Level 4 Module 42

Code	Course/Module Title	ECTS	Semester
EET405	Project 1	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	6	93	32
Description			
<p>The objectives of the Course to include applying knowledge and skills to real-world problems, integrating concepts from different areas of electrical engineering, conducting research and investigation, developing problem-solving and design and implementation of electrical devices in the available capabilities. fostering collaboration and teamwork, enhancing project management abilities, improving communication and presentation skills, addressing ethical considerations, and promoting reflection and continuous improvement as future engineers</p>			

Level 4 Module 43

Code	Course/Module Title	ECTS	Semester
EET406	Professional Ethics	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	42
Description			
<p>The student will be able and familiar with matters related to the ethics of the engineering profession of which he will be a member, which requires the condition of his knowledge of basic and essential matters to manage or deal with the community and those around</p>			

him properly and correctly

Level 4 Module 44

Code	Course/Module Title	ECTS	Semester
ETT407	Power system protection	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87

Students will learn the importance of protecting the electrical power system, the basic principles of protection, identifying the types of relays and how we protect of each part of the power system.

Level 4 Module 45

Code	Course/Module Title	ECTS	Semester
EET408	Stability of power System	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87

Description

This course provides an in-depth study of power system stability, which is essential for understanding the dynamic behaviour of power systems. The course covers various aspects of power system stability, including transient, small-signal, and voltage stability. Students will gain knowledge of stability analysis techniques, control methods, and mitigation strategies to ensure the secure and reliable operation of power systems.

Level 4 Module 46

Code	Course/Module Title	ECTS	Semester
EET409	High Voltage Techniques	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47

Description

Students learn about high voltage techniques and the types of insulating materials used in high voltage, also learn the methods of generation, high voltage measuring, testing, cables types which used in high voltage, the effect of over voltages and lightning

Level 4 Module 47

Code	Course/Module Title	ECTS	Semester
EET410	Project 2	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	6	93	32
Description			
<p>The objectives of the Course to include applying knowledge and skills to real-world problems, integrating concepts from different areas of electrical engineering, conducting research and investigation, developing problem-solving and design and implementation of electrical devices in the available capabilities. fostering collaboration and teamwork, enhancing project management abilities, improving communication and presentation skills, addressing ethical considerations, and promoting reflection and continuous improvement as future engineers.</p>			

Level 4 Module 48

Code	Course/Module Title	ECTS	Semester
EET411	Elective	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			

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