University of Thi-Qar

جامعة ذي قار

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

بكالوريوس - هندسة الطب الحياتي

Table of Contents

1. Overview
2. Undergraduate Modules 2023-2024
3. Contact

1. Overview

This catalog is about the courses (modules) offered in the Biomedical Engineering program to earn the Bachelor of Engineering degree. The program includes (300) modules with a total of (7496) student work hours and a total of 300 ECTS. The modules offered are based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة الطب الحياتي للحصول على درجة بكالوريوس الهندسة. يقدم البرنامج (60) مادة دراسية، على سبيل المثال، مع (7496) إجمالي ساعات حمل الطالب و 300 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
BME101	**Engineering Mechanics**	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0/0/0/2	123	77
Description			
Statics. Fundamentals of forces and force systems. Internal and external forces. Support reactions. Definition of a free-body diagram (FBD). Emphasis on development of FBD-drawing skills. Moment of a force. Force system resultants. Vector methods in two and three dimensions. Equilibrium analysis of particles and rigid bodies. Truss analysis by methods of joints and sections. Analysis of simple frames			

and machines. Analysis of friction. Centroids of composite areas and volumes. Resultants of distributed loads.

Dynamics.
Fundamentals of motion of particles and rigid bodies. Application of Newton's laws. Principles of position, velocity, and acceleration. Use of work-energy and impulse-momentum methods. Introduction to vibrations. Analytical and computational analysis of the kinematics and kinetics of planar multi-body mechanical systems. Vibration analysis of single degree of freedom systems. Engineering applications including dynamic balancing, vibration absorption and vibration isolation.

Module 2

Code	Course/Module Title	ECTS	Semester
BME102	**Intro to Biomedical Engineering I**	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2/0/0/2	108	67
Description			
Introduction to biomedical engineering design and problem solving using. Key elements include physiologic signals and data acquisition, instrumentation, graphics, measurement and error, teamwork and decision-making. Problem-solving elements will be applied to real-world biomedical problems introduced by practicing biomedical engineers as well as faculty.			

Module 3

Code	Course/Module Title	ECTS	Semester
ER104	**General Biology**	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/0	33	67
Description			
Ecology. Theory of evolution. Taxonomy. Animal diversity. Structures of biological molecules. Cell structure and function. Vertebrate animal anatomy, physiology, and development. Glycolysis and cellular respiration. Photosynthesis. Mitosis and meiosis. Mendelian and molecular genetics. Microbial diversity. Plant form and function. 3 hrs. lec., disc.			

Module 4

Code	Course/Module Title	ECTS	Semester
ER105	**Calculus**	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2/0/0/2	123	52
Description			
This course aims to provide the student with an understanding of functions, limits, Derivatives, Exponential, Logarithmic, and Inverse Trigonometric Functions, Applications of Derivatives, and Integrals			

Module 5

Code	Course/Module Title	ECTS	Semester
ER108	**Engineering Workshop**	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	0/0/2/0	48	2
Description			
This course aims to provide students with hands-on experience and practical skills in various engineering disciplines. The workshops will cover a range of topics related to mechanical, electrical, civil, and computer engineering. Students will have the opportunity to apply theoretical knowledge gained in other engineering courses to real-world scenarios. The course will also focus on fostering teamwork, problem-solving, and communication skills. Course Objectives: By the end of this course, students will be able to: Apply engineering principles and theories to practical workshop activities. Demonstrate proficiency in using engineering tools, equipment, and software. Work effectively in a team and communicate technical information clearly. Analyze and solve engineering problems through hands-on activities. Understand the importance of safety protocols in engineering workshops. Course Outline: Module 1: Introduction to Engineering Workshops Overview of workshop safety protocols Introduction to workshop tools and equipment Demonstration of basic workshop skills Module 2: Mechanical Engineering Workshop Introduction to mechanical workshop tools and machines Practical activities on machining, drilling, and shaping Assembly and disassembly of mechanical components.			

Module 6

Code	Course/Module Title	ECTS	Semester

UTQAR11	مهارات اللغة العربية	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1/0/0/0	33	17
Description			
This course is designed to develop students' proficiency in the Arabic language, focusing on the four language skills: listening, speaking, reading, and writing. Students will learn fundamental Arabic grammar and vocabulary to facilitate communication in various real-life situations. The course will also explore aspects of Arab culture and civilization to enhance students' cultural understanding.			

Module 7

Code	Course/Module Title	ECTS	Semester
BME103	**Anatomy I**	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/0/0	63	87
Description			
Introduction (anatomy position, section and planes, anatomic directions). Upper limb Breast. Pectoral region. Brachial Plexus and its branches and their clinical applications. Scapular region (anastamoses around the scapula, muscles attaching the scapula to the trunk, muscles attaching the scapula to the humerus, movement of scapula). Axilla and Brachium. Lymphatic system, axillary lymph node. Joints or articulation (classification of joints according to their functions, structures).type of cartilaginous joints, synovial joints, shoulder joint (sternoclavicular joint, acromioclavicular joint). Cubital fossa. Elbow joint ,wrist joint, the muscles of the arm, Fore arm. , the muscles of the hand and palm. The lower limb. Gluteal region, the thigh, the leg, the foot, inguinal legments, femoral triangle, General blood supply. Anterior components of the thigh. Femoral artery and nerve, Adductor canal and femoral hernia. Posterior components of the thigh, cutanous innervations of the thigh. Hip joint. Politeal fossa. Parallel resonance. Transients in R-C ccts. (capacitors in series and parallel and energy stored by a capacitor, R-L ccts., Faraday's law, transients in R-L ccts., inductors in series and parallels and energy stored by end). the TTL nand gate, TTL logic families, Emitter – coupled Logic (ECL) circuits, comparison of logic families).ems, type of energy pneumatic circuit, type of control valves, actuators, basic pneumatic circuit, pneumatic control.			

Module 8

Code	Course/Module Title	ECTS	Semester
BME104	**Intro to Biomedical Engineering II**	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0/2/0/0	78	97
Description			
Continuation of BIEN 1100. Key elements include modeling, fluid mechanics, rehabilitation engineering, and entrepreneurship. Problem-solving and design elements are applied to real-world biomedical problems introduced by practicing biomedical engineers as well as faculty.			

Module 9

Code	Course/Module Title	ECTS	Semester
UTQCO12	**Computer Science**	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/0/0	64	36
Description			
The Computer Science course provides students with a comprehensive understanding of the principles and practices of computer science. It covers a wide range of topics, including programming, algorithms, data structures, computer architecture, software development, and computer networks. The course aims to equip students with the necessary knowledge and skills to design, develop, and analyze computer systems and software applications.			

Module 10

Code	Course/Module Title	ECTS	Semester
BME105	**Medical Physics**	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0/0/0/0	48	52
Description			
Students learn how light, X-rays, radiopharmaceuticals, ultrasound, magnetic fields, and other energy probes are generated and how they interact with tissues and detectors to produce useful image contrast. Practical issues such as beam generation, dose limitations, patient motion, spatial resolution and dynamic range limitations, and cost-effectiveness will be addressed. Emphasis is placed upon diagnostic radiological imaging physics, including the planar X-ray, digital subtraction angiography mammography, computed tomography, nuclear medicine, ultrasound, and magnetic resonance imaging modalities.			

Module 11

Code	Course/Module Title	ECTS	Semester
ER106	**Engineering Drawing**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2/0/2/0	78	47
Description			

The Engineering Drawing course is designed to develop students' skills in creating and interpreting technical drawings used in engineering design and manufacturing processes. The course focuses on principles and techniques of drafting, including geometric constructions, orthographic projection, dimensioning, and tolerancing. Students will learn to use industry-standard computer-aided design (CAD) software and develop the ability to communicate engineering designs effectively through drawings.

Module 12

Code	Course/Module Title	ECTS	Semester
UTQEN11	**Basics of English language**	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1/0/0/0	33	17
Description			
This course covers: Grammar (nouns, pronouns, questions and short answers, possessive adjectives, possessive's, adjective + noun, present simple, question words, prepositions, past simple, past simple-regular and irregular verbs, adverbs, present continuous, future plans). Vocabulary, Reading, Writing, Listening and speaking skills.			

Module 13

Code	Course/Module Title	ECTS	Semester
UTQ102	**Human rights and democracy**	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1/0/0/0	33	17
Description			
The Human Rights and Democracy course explores the principles, theories, and practices of human rights and democracy. It examines the historical development, philosophical foundations, and legal frameworks of human rights, as well as the key elements of democratic governance. The course aims to foster a critical understanding of the importance of human rights and democracy in promoting social justice, equality, and the rule of law. Students will explore various case studies, analyze contemporary human rights issues, and examine the role of international organizations and civil society in advancing human rights and democracy.			