

نموذج وصف البرنامج الاكاديمي

اسم الجامعة: تكريت

الكلية: الهندسة

القسم العلمي: الهندسة الميكانيكية

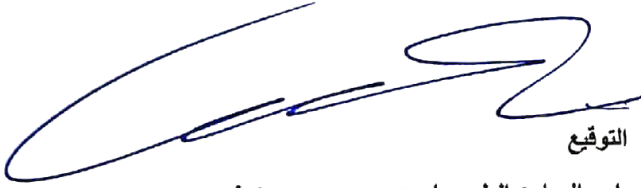
اسم البرنامج الاكاديمي او المهني: هندسة ميكانيكية

اسم الشهادة النهائية: بكالوريوس علوم في الهندسة الميكانيكية

النظام الدراسي: فصول دراسية

تاريخ اعداد الوصف: 2023/7/2

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التوقيع

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التاريخ: ٢٠٢٣ / ١ / ٢٥



التوقيع

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التاريخ: 2025/1/23



٢٠٢٣ / ١ / ٢٥
مصادقة السيد العميد

الاستاذ المساعد الدكتور
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دقق الملف من قبل

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التاريخ: ٢٠٢٣ / ١ / ٢٥

التوقيع

TIKRIT UNIVERSITY

جامعة تكريت



Bachelor of Science – Mechanical Engineering

بكالوريوس علوم - هندسة ميكانيكية



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1. Overview

This catalogue is about the courses (modules) given by the program of Mechanical Engineering to earn the Bachelor of Science degree. The program delivers (48) Modules with (4500) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة:

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة الميكانيكية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية مع (4500) إجمالي ساعات حمل الطالب و 240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

1

Code	Course/Module Title	ECTS	Semester
MATH-101	Calculus I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	1	78	72
Description			
<p>This course covers topics of differential and integral calculus including limits and continuity, higher-order derivatives, curve sketching, differentials, definite and indefinite integrals (areas and volumes), and applications of derivatives and integrals. In addition, students review and extend their knowledge of trigonometry and basic analytic geometry. Important objectives of the calculus sequence are to develop and strengthen the students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply the tools of calculus to a variety of problem situations.</p>			

2

Code	Course/Module Title	ECTS	Semester
ENG-106	Engineering Workshops	6	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2	2	64	86
Description			
<p>The engineering workshop course focuses on identifying risks in the work environment and industrial safety guidelines. And training on how to measure and determine, and the use of filing tools and their work. Learn about the types of wood used in carpentry, the process of shaping it, and the use of carpentry tools and machines. Training in welding work, its types, and the process of joining metals by welding. Training on various casting works and training on mechanical operation, which includes turning, milling, and grinding. Training on pipe</p>			

knowledge, how to connect, sanitary engineering works, and training on the basics of electrical workshops.

3

Code	Course/Module Title	ECTS	Semester
ENG-104	Computer Science 1	3	1
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	2	49	26
Description			
<p>This course offers students a comprehensive exploration of the fundamental concepts and principles that underpin the field of computer science. By delving into various subjects including the historical development of computing, data representation, computer components, algorithms, programming languages, operating systems, applications, internet and networking, and cyber-security, students will develop a well-rounded understanding of the discipline. By examining the evolution of computer science over time, students will acquire a broad perspective on the field and its significance in contemporary society. Through a combination of theoretical knowledge and practical applications, this module equips students with the necessary foundation to pursue further studies or careers in computer science.</p>			

4

Code	Course/Module Title	ECTS	Semester
ENG-101	Engineering Drawing	6	1
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	4	93	57
Description			

An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in engineering drawing. Other areas of study in this course may include projected views and development of surfaces.

5

Code	Course/Module Title	ECTS	Semester
ENG-108	Engineering Mechanics - Statics	5	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2	1	64	61
Description			
<p>The course covers the following topics; statics of particles: forces in plane, forces in space, equilibrium, moment of a force, moment of a couple, equivalent systems of forces on rigid bodies, equilibrium in two dimensions, equilibrium in three dimensions, distributed forces: centroids and center of gravity, analysis of structures: trusses, frames and machines, internal forces in beams and cables, friction, moments of inertia of areas, moments of inertia of masses.</p>			

6

Code	Course/Module Title	ECTS	Semester
ENG-108	Democracy and Human Rights	2	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2		33	17

Description

مادة دراسية تعرف الطلبة بحقوق الانسان التي يجب يتمتع بها جميع مكونات البشر لمجرد اننا من ابناء البشر، وهذه الحقوق متأصلة في جميع البشر مهما كان عرقهم او جنسهم او قوميتهم او مذهبهم ولا تمنح من أي دولة، وتتضمن حقوق الانسان والطفل في الحضارات القديمة والاسلام، المواثيق الدولية، مصادر وضمانات حقوق الانسان، القوانين والداستير، مجلس حقوق الانسان، العولمة، التقدم التكنولوجي واثره على حقوق الانسان. و كذلك تعرف هذه المادة بالديمقراطية و التطرق الى مفهومها ومعرفة الجذور التاريخية لها، المكونات، الخصائص، المميزات، الضمانات، علاقة الديمقراطية ب (الدستور، مؤسسات المجتمع المدني، حقوق الانسان، الحكم الرشيد، الانتخابات)، الديمقراطية المعاصرة.

6E

Code	Course/Module Title	ECTS	Semester
ENG-113	Arabic	2	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2		33	17
Description			
<p>اللغة العربية: هي ما نطق به العرب، أو هي لغتهم، وهي اللغة السامية التي حفظت وجودها، وهي لغة عالمية وإنسانية حية تتميز بنظام صوتي وصرفي ونحوي وتركيب، وألفاظها مدلولات مختلفة، فهي اللسان الذي تكلمه العرب، ونزل به القرآن الكريم الذي لا يمكن فهمه إلا من خلال فهم اللغة العربية.</p>			

7

Code	Course/Module Title	ECTS	Semester
MATH-102	Calculus II	6	2
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
4	1	78	72

Description
A continuation of Calculus I. This is a study of multivariable calculus including vector-valued functions and the calculus of curves in space, differential calculus of multivariate functions, integral calculus of multivariate functions, spherical and cylindrical coordinates, line and surface integrals.

8

Code	Course/Module Title	ECTS	Semester
HUMN-102	English Language 1	2	2
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	17
Description			
This course is designed to provide engineering students with the necessary oral and written skills required for effective communication in academic and workplace contexts, both with experts in their field and lay persons. It begins by introducing them to the principles of good academic practice, which are also presented as a model for ethical workplace practice, and thus help them to avoid issues such as plagiarism. The main part then leads on to developing research and summarizing skills that form the basis for the later activities. Students next learn to apply these skills to conducting technical presentations, as well as in group discussions that culminate in project planning activities.			

9

Code	Course/Module Title	ECTS	Semester
MECH-102	Mechanical Drawing	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	78	72
Description			

This course will introduce students to the concepts and techniques of mechanical drawing. It will cover basic line drawings, use of mechanical drawing equipment, isometric and orthographic projections, and geometric drawings. Students will prepare geometrical drawings and draw layouts. This course will also enable students to perform layout of structural steel using fabricating practices. Students will be able to determine elevations of structures and how to construct using calculating equipment including transits, scientific calculators, and various squaring and leveling tools. The student will also be able to calculate the layout of pipe including figuring offsets, runs, and travel distances.

10

Code	Course/Module Title	ECTS	Semester
MECH-103	Manufacturing Processes 1	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	49	76
Description			
The essential point in this course is to give the basics of manufacturing processes, starting with the definition and classification of materials, in addition to methods of selection. And then focus on studying the physical and mechanical properties and methods of preparing minerals. Non-traditional operations with their details were also discussed			

11

Code	Course/Module Title	ECTS	Semester
MECH-101	Thermodynamics	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
Thermodynamics is an exciting and fascinating subject that deals with energy, which is essential for sustenance of life, and thermodynamics has long been an essential part of			

engineering curricula all of the world. It has a broad application area ranging from microscopic organisms to common household appliances, transportation vehicles, power generation systems, this course contains sufficient material for fundamental and principles of thermodynamics.

12

Code	Course/Module Title	ECTS	Semester
MECH-104	Electrical Engineering	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>The electrical engineering course focus on basic electrical elements and fundamentals of electrical quantities such as voltage, current, resistor and electrical power then to series, parallel and how to analyze the electrical circuits in Mesh, Nodal for DC and AC circuits as well as bridge circuits then move to Alternating current AC circuits and students will able to get knowledge to Time dependent signals, average and RMS values. Capacitance and inductance. Elements in series and parallel. Kirchhoff's laws and Ohm's law. Introduction to Mesh, Nodal analysis, and superposition, The venin, Norton and maximum power transfer theorems for AC circuits.</p>			

13

Code	Course/Module Title	ECTS	Semester
MATH-201	Engineering Analysis	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
4	1	78	47
Description			
<p>This course will cover a range of engineering analysis techniques related to the first and second differential and then utilizes it to solve problems in mechanical engineering</p>			

applications, methods for solving differential equations are discussed. the course also includes power series solutions, special functions, and Laplace transforms and utilizes it to solve the differential equation. Fourier series and separation of variables are also introduced.

14

Code	Course/Module Title	ECTS	Semester
MECH-204	Metallurgical Engineering	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>The central point of this course is to provide a physical basis that links the structure of materials with their properties, focusing primarily on metals. With this understanding in hand, the concepts of alloy design and microstructural engineering are also discussed, linking processing and thermodynamics to the structure and properties of metals.</p>			

15

Code	Course/Module Title	ECTS	Semester
MECH-201	Fluid Mechanics 1	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>The course begins with the material properties of fluids. This is followed by studying fluid statics including pressure measurement, hydrostatics and buoyancy. Then studying the principles of fluid motion including mass conservation (the continuity equation) and energy conservation (Bernoulli's equation). Next, this course description provides a necessary summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve. Also, the demonstrates whether he has made the most of the available learning opportunities. besides, It should be linked to the program description. In addition, this course is provided to engineering students with</p>			

basic skills in fluid mechanics. It provides a clear and thorough demonstration of the theory and application of hydrodynamics equations. Among the main concepts that are covered in this course are pressure, velocity, discharge of flow, laminar and turbulent flow.

16

Code	Course/Module Title	ECTS	Semester
MECH-202	Computer Programming	3	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	11

Description

The MATLAB programming course is designed to provide students with a comprehensive understanding of MATLAB, a powerful programming language and environment widely used in scientific, engineering, and data analysis domains. Through hands-on exercises and practical examples, students will learn the fundamentals of MATLAB syntax, data manipulation, and visualization. They will gain proficiency in writing MATLAB scripts and functions to solve numerical and mathematical problems, develop algorithms, and simulate real-world systems. The course will also cover topics such as application development, integration with other tools and languages, and advanced techniques like parallel computing and machine learning. By the end of the course, students will have the skills to effectively utilize MATLAB for various computational and analytical tasks, empowering them to excel in their respective fields.

17

Code	Course/Module Title	ECTS	Semester
MECH-203	Strength of Materials 1	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61

Description

This course aims to establish fundamental knowledge of Strength of Materials. Presentation of the course starts by introducing simple stress and simple strain utilizes it to solve problems in beams and columns and rivets.

18

Code	Course/Module Title	ECTS	Semester
MECH-205	Engineering Mechanics – Particle dynamics	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	63	62
Description			
<p>In this course, the students will be introduced to the fundamentals of Dynamics of Engineering Mechanics. The topics will cover a wide range of applications that, collectively, form building blocks of the dynamics world for an everyday mechanical engineer. Typically, the course starts with the behavior and properties of particles and the fundamental relationships of distance, velocity, and acceleration. There is a broad spectrum to cover to accommodate most of the applications in more than one coordinate system. The analysis of particle dynamics forms the basis for the rigid body mechanics.</p>			

18F

Code	Course/Module Title	ECTS	Semester
ENG-114	The Crimes of Baath Regime in Iraq	2	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	17
Description			
<p>جرائم حزب البعث: هي الجرائم التي ارتكبتها الحزب بأبناء الشعب العراقي والتي ادت الى اثار سلبية على المستوى النفسي والاجتماعي والثقافي والاقتصادي والبيئي وعسكرة المجتمع.</p>			

19

Code	Course/Module Title	ECTS	Semester
HUMN-203	English Language 2	2	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	17
Description			
<p>You will also develop the business communication skills required for anyone in the global economy. This includes topics like delivering presentations, writing emails, or speaking in meetings. This gives you the ability to communicate across departments with a strong ability in reading, writing, speaking, and listening.</p>			

20

Code	Course/Module Title	ECTS	Semester
MECH-206	Engineering Mechanics- Rigid Dynamics	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	87
Description			
<p>In this course, the students will be introduced to the fundamentals of Dynamics of Engineering Mechanics. The topics will cover a wide range of applications that, collectively, form building blocks of the dynamics world for an everyday mechanical engineer. Typically, the course starts with the behavior and properties of rigid body dynamics and the fundamental relationships of distance, velocity, and acceleration. There is a broad spectrum to cover to accommodate most of the applications in more than one coordinate system. The analysis of the rigid body motion depends on the background of the particle dynamics.</p>			

21

Code	Course/Module Title	ECTS	Semester
MECH-207	Strength of Materials 2	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)

2	2	64	86
Description			
This course aims to establish fundamental knowledge of Strength of Materials. Presentation of the course starts by introducing simple stress and simple strain utilizes it to solve problems in beams and columns and rivets.			

22

Code	Course/Module Title	ECTS	Semester
MECH-208	Fluid Mechanics 2	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
The course begins with the material properties of fluids. This is followed by studying fluid statics including pressure measurement, hydrostatics and buoyancy. Then studying the principles of fluid motion including mass conservation (the continuity equation) and energy conservation (Bernoulli's equation). This is followed by sections on the energy equation and flow of viscose fluid applied to a range of problems in mechanical engineering, including steady flow in pipes, design of pump and turbine-pipeline systems ...etc. Next, this course description provides a necessary summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve. Also, the demonstrates whether he has made the most of the available learning opportunities. besides, It should be linked to the program description. In addition, this course is provided to engineering students with basic skills in fluid mechanics. It provides a clear and thorough demonstration of the theory and application of hydrodynamics equations. Among the main concepts that are covered in this course are pressure, velocity, discharge of flow, laminar and turbulent flow.			

23

Code	Course/Module Title	ECTS	Semester
MECH-209	Applied Thermodynamics	6	2

Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>Thermodynamics is an exciting and fascinating subject that deals with energy, which is essential for sustenance of life, and thermodynamics has long been an essential part of engineering curricula all of the world. It has a broad application area ranging from microscopic organisms to common household appliances, transportation vehicles, power generation systems, this course contains sufficient material for fundamental and principles of thermodynamics.</p>			

24

Code	Course/Module Title	ECTS	Semester
MECH-210	Computer Aided Drawing	4	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
1	3	64	36
Description			
<p>In Solidworks course, you will learn the fundamental tools and concepts for the Solidworks engineering and design software. You will learn how to use the Solidworks software to build parametric models of parts and assemblies, and how to make drawings of those parts and assemblies.</p>			

25

Code	Course/Module Title	ECTS	Semester
MATH-301	Numerical Analysis	4	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	49	76
Description			

This course will cover a range of numerical analysis techniques related to matrix problems, solving systems of linear algebraic equations, solving nonlinear equations, Curve Fitting, polynomial approximation and interpolation, numerical integration and differentiation, and ordinary and partial differential equations. All of these numerical problems will be programmed, debugged, and executed.

26

Code	Course/Module Title	ECTS	Semester
MECH-301	Engineering Management and Ethics	4	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	48	52
Description			
<p>The essential point in this course is to give the basics of engineering management and ethics, starting with the concepts of engineering management, industrial engineering functions, characteristics of construction, project phases, resource learning technique in addition to economic and technical feasibility studies. And then focus on The relationship between cost, profit and volume of production, project management, operation management and types of productivity .</p>			

27

Code	Course/Module Title	ECTS	Semester
MECH-302	Theory of Machines	6	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	2	64	86
Description			
<p>This course aims to defined as that branch of engineering science which deals with the study of relative motion between various elements of a machine and the forces which act on them.</p>			

28

Code	Course/Module Title	ECTS	Semester
MECH-303	Heat Transfer conduction	6	1

Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>This is the first course in heat transfer, with an emphasis on understanding the fundamental physics underlying different heat transfer processes, making proper approximations for analytical heat transfer calculations and numerical methods for engineering heat transfer analysis. Topics include: introduction to three modes of heat transfer, thermal resistance network analysis, steady-state conduction, transient conduction, numerical methods for heat conduction.</p>			

29

Code	Course/Module Title	ECTS	Semester
MECH-304	Gas Dynamics	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>The course introduces compressible flow and its constitutive equations and turbomachinery. The physical concepts behind isentropic flows, area-Mach number relation etc. will be discussed with practical problems in mind. Properties of shocks and expansions are important parts of this course. flows with heat transfer (Rayleigh line), friction (Fanno line) are also defined in this course. An application such as compressors, turbines and jet engine are considered as well. The hydraulic machines such as impulse, reaction turbines and pumps are introduced in this course. All the numerical examples will be in SI units.</p>			

30

Code	Course/Module Title	ECTS	Semester
MECH-305	Manufacturing Process 2	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			

The essential point in this course is to give the basics of metal casting, starting with the definition and classification of furnaces, in addition to mold casting with their types. And then focus on studying welding processes and methods of metal forming.

31

Code	Course/Module Title	ECTS	Semester
MATH-302	Statistics and Probability	3	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	48	27
Description			
<p>The course covers the following topics; statistics of applications: Data collection, Data representation, Central measurements, comparisons between central measurements, Variation measurements, comparisons between Variation measurements Sampling and Estimation, Principles of probability theory, Probability Distributions, Correlation and Regression, Hypotheses and Fitness tests, Test of variation, one-way test, Test of variation, two-way test, method of virtual work.</p>			

32

Code	Course/Module Title	ECTS	Semester
MECH-306	Machine Design 1	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>Procedures for the practice of mechanical design, Factor of safety and design codes, concepts of axial, radial, circumferential location, basic bearing design, lubrication, static and dynamic theories of failure. Selection of component bought out from specialist suppliers, design and validation of components, selection of materials, manufacturing methods or systems concepts that are related to more than component. Use of appropriate software in the design process.</p>			

33

Code	Course/Module Title	ECTS	Semester
MECH-307	Heat Transfer (Convection and Radiation)	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>The course considers the analysis of heat transfer by convection using empirical and boundary layer approximations. Both forced and natural convection are considered. Force convection deals in two ways which are external and internal. Natural convection from the solid surfaces is taken into account. The Radiation heat transfer is considered with applications to multi-body radiation. In addition, the properties of thermal radiation, Radiation heat transfer between solids and shape factor is taken in consider</p>			

34

Code	Course/Module Title	ECTS	Semester
MECH-308	Internal Combustion Engine	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>This course studies the fundamentals of how the design and operation of internal combustion engines affect their performance, operation, fuel requirements, and environmental impact. Topics include fluid flow, thermodynamics, combustion, heat transfer and friction phenomena, and fuel properties, with reference to engine power, efficiency, and emissions. Students examine the design features and operating characteristics of different types of internal combustion engines: spark-ignition, diesel, stratified-charge, and mixed-cycle engines. Class includes lab experiments in the Heat Engine Laboratory.</p>			

35

Code	Course/Module Title	ECTS	Semester
MECH-309	Engineering Materials	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	48	77
Description			
<p>This course provides a fundamental behavior and properties of various engineering materials. Topics include introduction to mechanical behavior of materials, characteristics of metals, and selection of materials.</p>			

36

Code	Course/Module Title	ECTS	Semester
MECH-310	Energy Conversion	4	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	48	52
Description			
<p>This course aims to establish fundamental knowledge of energy conversion design and engineering. To achieve this goal, fundamentals of thermodynamics, heat transfer, and transport physics applied to energy conversion systems. Analysis of energy conversion in thermal, mechanical, nuclear, and electromechanical processes in power systems will be offered. Topics include fossil and nuclear power systems, solar energy, wind energy, biomass energy, and photovoltaic systems. Also, this course discusses strategies to increase energy efficiency and more environmentally friendly operations and assesses design alternatives and selection criteria.</p>			

37

Code	Course/Module Title	ECTS	Semester
MECH-401	Engineering Graduation Project I	4	1

Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	67
Description			
<p>Preparatory studies of the literature and data collection for the graduation project in a particular area of concentration and under the supervision of one of the faculty members. The course covers directed readings in the literature of civil engineering, introduction to research methods, seminar discussions dealing with special engineering topics of current interest. Planning, design, construction and management of an engineering project. Writing a technical report.</p>			

38

Code	Course/Module Title	ECTS	Semester
MECH-402	Mechanical Design 2	6	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>Procedures for the practice of mechanical design, basic gearing design, lubrication, screws, belt and chain drives. Selection of component bought out from specialist suppliers, design and validation of components, selection of materials, manufacturing methods or systems concepts that are related to more than component. Use of appropriate software in the design process.</p>			

39

Code	Course/Module Title	ECTS	Semester
MECH-403	Vibration 1	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			

Procedures for the practice of mechanical design, basic gearing design, lubrication, screws, belt and chain drives. Selection of component bought out from specialist suppliers, design and validation of components, selection of materials, manufacturing methods or systems concepts that are related to more than component. Use of appropriate software in the design process.

40

Code	Course/Module Title	ECTS	Semester
MECH-404	Control 1	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>A classical control system course is a specialized field of study that focuses on the principles, theories, and techniques used in the design and analysis of control systems. Classical control refers to the traditional methods and tools used before the advent of modern control theory, which typically includes techniques such as proportional-integral-derivative (PID) control, root locus analysis.</p>			

41

Code	Course/Module Title	ECTS	Semester
MECH-405	Principals of Air Conditioning	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>This course aims to establish fundamental knowledge of Air-Conditioning design and engineering. To achieve this goal, fundamentals of thermodynamics, heat transfer, and transport physics applied to Air-Conditioning systems. Topics include design temperature and outdoor and indoor room temperatures, Introduction, governing equations of heating load calculation, heat loss through building structure, Infiltration and space heating, cooling load calculation, heat sources. Also, this course discusses Pressure drop of internal fluid flow through circular and rectangular duct and fittings. Design and selection of Air- Conditioning systems. All the numerical examples will be in SI units.</p>			

42

Code	Course/Module Title	ECTS	Semester
MECH-406	Power Plant Engineering	5	1
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	1	64	61
Description			
<p>This Course provides a simple understanding of the power plant engineering. The course contains the details of steam and gas thermal power plants, hydro power plants, nuclear power plants, along with solar, wind and geothermal energy power systems in addition to the direct energy conversion. The economics of power generation and the environmental aspect of power generation are also being addressed in this course.</p>			

43

Code	Course/Module Title	ECTS	Semester
MECH-407	Engineering Graduation Project II	4	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	67
Description			
<p>Graduation project leading to BSc. Degree, arranged between a student and the faculty member. The aim of the project must be one of the following: application of new scientific methods for solving different mechanical problems, and their modeling, analysis and Investigation of new research areas in mechanical engineering fields. Design, develop and present a project based on the knowledge acquired during undergraduate studies. Writing a technical report.</p>			

44

Code	Course/Module Title	ECTS	Semester
MECH-408	Control 2	5	2

Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
<p>A modern control system course is an advanced field of study that focuses on the principles, theories, and techniques used in the design and analysis of control systems using modern control theory. It typically covers topics such as frequency response analysis, state space analysis of continuous systems, controllability and observability, eigenvalues, eigenvectors, and modern control design. Let's explore each of these components in more.</p>			

45

Code	Course/Module Title	ECTS	Semester
MECH-409	Heating, Ventilation, and Air Conditioning (HVAC)	6	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	86
Description			
<p>The course introduces Heating, Ventilation and Air Conditioning and its constitutive equations. The physical concepts, basic concepts of Heating, Ventilation and Air Conditioning, Duct design by constant and regain method, duct design by velocity method, physical differences between flow types. This course aims to establish fundamental knowledge of Heating, Ventilation and Air Conditioning design and engineering. To achieve this goal, fundamentals of thermodynamics, heat transfer, and transport physics applied to Heating, Ventilation and Air Conditioning systems. Analysis of Heating, Ventilation and Air Conditioning in thermal Air-Conditioning systems will be offered. Topics include Fans performance, Fan system characteristics curves, Fan system characteristics curves, fan similarity laws. Also, this course discusses Heating, Ventilation and Air Conditioning: Thermally activated absorption technology. Design and selection of Heating, Ventilation and Air Conditioning systems. All the numerical examples will be in SI units.</p>			

46

Code	Course/Module Title	ECTS	Semester
MECH-410	Vibration 2	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)

2	2	64	61
Description			
This course aims to establish fundamental knowledge of mechanical vibrations. Presentation of the course starts by applying Newton's second law to derive the equation of motion and then utilizes it to find the natural frequency and mode shapes if the system is two degree of freedom.			

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Code	Course/Module Title	ECTS	Semester
MECH-411	Electrical Machines	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	64	61
Description			
This course aims to introduce the student to establish fundamental knowledge of the main technologies for the generation and transformation of electrical power with an emphasis on their operating principles, their stability when interconnected and techniques for their control.			

48

Code	Course/Module Title	ECTS	Semester
MECH-412	Industrial Engineering	5	2
Lectures (hr/w)	Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	64	61
Description			
The essential point in this course is to give the basics of industrial engineering, starting with the industrial engineering functions, in addition to economic and technical feasibility studies. And then focus on The relationship between cost, profit and volume of production, types of productivity .			

ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي