

جامعة العين العراقية
ALAYEN IRAQI UNIVERSITY



الكلية التقنية الهندسية

College of Technical Engineering

بكالوريوس هندسة – تقنيات هندسة ميكانيك القوى



Bachelor of Science degree. The program delivers (6) Modules with (6000) total student workload

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة تقنيات ميكانيك القوى للحصول على درجة بكالوريوس العلوم، بإجمالي 240 وحدة أوروبية (ECTS)، تعادل 6000 ساعة من حمل الطالب، موزعة على 48 مادة دراسية. ويعتمد البرنامج في تقديم موادّه الدراسية على عملية بولونيا (Bologna Process)، بما ينسجم مع المعايير الأوروبية في تنظيم البرامج الأكاديمية واحتساب الوحدات الدراسية

2. Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Year /Semester
ATU12013	Single Variables Calculus	5	1/ 1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
Course Outcomes: At the end of the course, students are able to: 1. Describe elementary special functions (e.g. exponential, log, and trigonometric functions) which arise in engineering. 2. Practice the skills obtained from differential calculus to deal with models in engineering. 3 Practice the skills obtained from legrall calculus to deal with models in engineering			

Module 2

Code	Course/Module Title	ECTS	Year /Semester
ATU12024	Engineering Mechanics-Static	8	1/1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	123	77
Description			
Course Outcomes: At the end of the course, students can: 1. An ability to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium. 2. An understanding of the analysis of distributed loads. 3. A knowledge of internal forces and moments in members. 4. An ability to calculate centroids and moments of inertia. 5. A knowledge of kinematic and kinetic analyses and energy and momentum methods for particles and systems of particles. 6. A knowledge of kinematic and kinetic analyses and energy and momentum methods for rigid bodies. A knowledge of kinematic and kinetic analyses and energy and momentum methods for particles and systems of particles. A knowledge of kinematic and kinetic analyses and energy and momentum methods for rigid bodies			

Module 3

Code	Course/Module Title	ECTS	Year /Semester
FEE110	Engineering physics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	78	47
Description			
Course Outcomes: At the end of the course, students are able to: Understand the fundamental principles and concepts of engineering physics and recognize their importance in engineering applications.-2Explain the basic laws of mechanics, waves, thermodynamics, electricity, and magnetism, and apply them to solve engineering problems.-3Analyze physical phenomena using mathematical models and develop problem-solving skills related to engineering systems.-4Perform basic physics experiments, analyze experimental data, interpret results, and estimate measurement errors using appropriate scientific methods			

Module 4

Code	Course/Module Title	ECTS	Year /Semester
ATU12016	CAD Drawing	7	1/1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	6	78	47
Description			
Course Outcomes: At the end of the course, students can: Introduction in engineering drawing, engineering drawing applications, engineering process, analysis model to view and study the full and half Sections, conclusion of the third projection, Draw isometric and Oblique.			

Module 5

Code	Course/Module Title	ECTS	Year /Semester
ATUU113	English Language 1	2	1/1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		18	32
Description			

Define a special knowledge and basic concepts in the English language, review (words, terms and phrases commonly utilized) with practical everyday language that students need, the fundamental principles of grammar used in the English language such as question and answer, the negative, the tag questions, the singular and plural, the numbers, nouns, pronouns, the verb (to be, to have, and to do), adjectives, regular and irregular verbs, using so & neither, and adverbs, degrees of comparison, conjunctions and interjections, kinds of the letter (S) with general exercises. Also, an accurate description of the nature of vocabularies and idioms used by the chemical engineers and what the

Module 6

Code	Course/Module Title	ECTS	Year /Semester
ATUU111	Human Right and Democracy	2	1/1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	33	17
Description			
: هدف مادة حقوق الإنسان والديمقراطية إلى تعريف الطلبة بالمبادئ الأساسية لحقوق الإنسان، وأصولها التاريخية والقانونية، والمواثيق والاتفاقيات الدولية ذات الصلة، مع بيان أهمية حماية الحقوق والحريات الأساسية وتعزيز قيم العدالة والمساواة وعدم التمييز. كما تتناول المادة مفهوم الديمقراطية، ومبادئها، وأنظمة الحكم الديمقراطي، وآليات المشاركة السياسية، وسيادة القانون، ودور المؤسسات الدستورية والمجتمع المدني في ترسيخ الممارسات الديمقراطية. وتسعى المادة إلى تنمية وعي الطلبة بحقوقهم وواجباتهم، وتعزيز قيم المواطنة، واحترام التنوع، والتسامح، والمسؤولية المجتمعية، بما يساهم في إعداد أفراد قادرين على المشاركة الإيجابية في بناء مجتمع ديمقراطي يحترم حقوق الإنسان.			

Module 7

Code	Course/Module Title	ECTS	Year /Semester
ATUU112	Arabic language	2	1/2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	18
Description			
Course Outcomes: تهدف مادة اللغة العربية إلى تنمية الكفايات اللغوية لدى الطلبة في مجالات القراءة والكتابة والاستماع والتحدث، وتعزيز قدرتهم على استخدام اللغة العربية الفصحى استخدامًا صحيحًا في المواقف الأكاديمية والحياتية. كما تتناول المادة القواعد النحوية والصرفية والإملائية، وتنمية الثروة اللغوية، وتحليل النصوص الأدبية والوظيفية، وتنمية مهارات التعبير الشفهي والكتابي. وتسعى المادة إلى تعزيز التذوق الأدبي، وتنمية التفكير النقدي، والقدرة على فهم النصوص وتحليلها، وإنتاج كتابات سليمة ومنظمة، بما يساهم في تطوير مهارات التواصل الفعال والمحافظة على سلامة اللغة العربية والاعتزاز بها بوصفها لغةً للعلم والثقافة والهوي			

Module 8

Code	Course/Module Title	ECTS	Year /Semester
ATU12021	Multi-Variables Calculus	6	1/2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

4	1	78	72
Description			
Course Outcomes: This course introduces the fundamental concepts of calculus for functions of several variables. Topics include vectors and analytic geometry in three-dimensional space, vector-valued functions, partial derivatives, the chain rule, directional derivatives, gradient vectors, tangent planes, extrema of multivariable functions, double and triple integrals, change of variables using polar, cylindrical, and spherical coordinates, vector fields, line and surface integrals, and the fundamental theorems of vector calculus, including Green's Theorem, Stokes' Theorem, and the Divergence (Gauss) Theorem. Emphasis is placed on developing analytical and problem-solving skills and applying multivariable calculus techniques to problems in mathematics, engineering, physics, and other scientific disciplines.			

Module 9

Code	Course/Module Title	ECTS	Year /Semester
ATU12022	Engineering Materials	7	½
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	108	67
Description			
This course introduces the fundamental principles of engineering materials and their applications in engineering design and manufacturing. It covers the classification, structure, properties, processing, and performance of metallic, ceramic, polymeric, composite, and advanced materials. Topics include atomic bonding, crystal structures, mechanical properties, material testing, heat treatment, phase diagrams, corrosion, material degradation, and material selection based on engineering requirements. The course emphasizes the relationship between material structure, properties, processing, and performance, enabling students to evaluate and select appropriate materials for a wide range of engineering applications while considering economic, environmental, and sustainability factors.			

Module 10

Code	Course/Module Title	ECTS	Year /Semester
ATU1111	Computer	3	½
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
Course Outcomes: At the end of the course, students are able to: 1. Identify different types of computer hardware & software. 2. Give a student the skill in the use of computers and service applications			

Module 11

Code	Course/Module Title	ECTS	Year /Semester
ATU12023	Fundamentals of Thermodynamics	2	1/2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	78	72

Description
-1 Basic concepts, properties of substances, energy, heat, and work.2 First and Second Laws of Thermodynamics, entropy, and thermodynamic cycles.3 Analysis and applications of thermodynamic systems in engineering

Module 12

Code	Course/Module Title	ECTS	Year /Semester
ATU12025	Fundamentals of Electricity	6	1/2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
-	6	78	72
Description			
1 Basic electrical concepts, voltage, current, resistance, and power.2 DC and AC circuits, electrical laws, and circuit analysis.3 Electrical systems, measurements, and engineering applications.,			

Module 13

Code	Course/Module Title	ECTS	Year /Semester
ATU12014	Workshop	4	2/1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
Course Outcomes: 1 Basic workshop tools, equipment, and safety procedures.-2Practical skills in machining, fabrication, and material handling.-3Hands-on applications of manufacturing and engineering techniques.			