

Department of Sustainable Energy Engineering

Modules Guide



دليل المواد الدراسية

2024-2025

OVERVIEW

This catalogue presents the courses (modules) offered by the Department of Sustainable Energy Engineering within the Bachelor of Science degree program. The program consists of 51 modules with a total of 5750 student workload hours and 240 ECTS credits required to obtain the Bachelor's degree. The structure and delivery of the modules follow the Bologna Process.

By:

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Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
SEE101	Engineering Mechanics-Statics I	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	63	62

Description

This course provides an introduction to the fundamental concepts of statics and the analysis of forces acting on bodies in equilibrium. It covers the study of forces, moments, and couples and their effects on rigid bodies in two- and three-dimensional systems. The course includes methods for constructing and interpreting free body diagrams, analyzing and determining resultant forces, and applying equilibrium principles to simple trusses and frames. It also explores the phenomena of friction and its role in mechanical components, along with the determination of the centroid and center of gravity for various areas and rigid bodies.

Module 2

Code	Course/Module Title	ECTS	Semester
SEE102	Mathematics I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	78	72

Description

This course provides students with a comprehensive foundation in the principles of physics and their mathematical applications. It emphasizes the development of clear and rigorous mathematical reasoning, including the effective use of physical equations, and reinforces core physics concepts while enabling their practical application in real-world contexts. Students learn to translate physical descriptions into mathematical equations, interpret the physical meaning of results, and apply algebraic and geometric methods to solve problems. The course also covers the use of graphs and charts to present results effectively, the identification of appropriate solution strategies and necessary assumptions, and the cultivation of flexible and creative problem-solving skills, alongside building an integrated understanding of mathematics and improving the ability to communicate scientific ideas.

Module 3

Code	Course/Module Title	ECTS	Semester
SEE103	Electric Circuits	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47

Description

This course is designed to equip students with the skills to identify, define, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. It emphasizes the use of circuit analysis techniques, including Ohm's Law, Kirchhoff's Voltage and Current Laws, and network theorems such as Thevenin and Norton, to analyze electrical circuits. Furthermore, the course trains students to design and perform precise measurements and tests with quality assurance, interpret and analyze results, and apply engineering judgment to make informed decisions.

Module 4

Code	Course/Module Title	ECTS	Semester
SEE104	Physics	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	63	37

Description

This course offers a focused introduction to classical mechanics, fluid mechanics, thermodynamics, modern physics, and basic electronics. It covers SI units, vector and scalar quantities, kinematics and dynamics including Newton's laws, work, energy, power, momentum, friction, Hooke's law, simple harmonic motion, and gravitation. In fluids, it addresses pressure, density, hydrostatics, buoyancy, Pascal's principle, continuity, and Bernoulli's equation. Heat transfer by conduction, convection, and radiation is introduced, along with atomic structure, electron shells, energy levels, valence electrons, ions, and the Bohr model. Basic electrical concepts include conductors, insulators, semiconductors, diodes, transistors, circuit elements, Ohm's law, power, energy, series and parallel circuits, and Kirchhoff's laws.

Module 5

Code	Course/Module Title	ECTS	Semester
SEE105	Introduction to Sustainable Engineering	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	63	62

Description

The course aims to understand the fundamental principles of energy and sustainability and their importance in modern society, identify different energy sources, including fossil fuels, nuclear, and renewables like solar, wind, and geothermal. Analyze the environmental, economic, and social impacts of energy production and consumption, promote awareness of sustainable practices in resource utilization to protect the environment and develop the skills and knowledge necessary for careers in environmental consulting, energy management, and sustainability policymaking.

Module 6

Code	Course/Module Title	ECTS	Semester
UOM1031	Computer 1	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12

Description

This course introduces students to the fundamentals of computers, their components, and practical skills in using key software applications. It prepares students to interact effectively with computers and provides hands-on experience with Microsoft Word and Excel.

Module 7

Code	Course/Module Title	ECTS	Semester
UOM1011	Arabic Language 1	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17

Description

The course will cover the fundamental definitions of the Arabic language, key grammatical rules related to tenses, and the development of syntactic skills concerning singular and plural forms, as well as indeclinable nouns. Additionally, the curriculum will include rhetoric and its practical applications. By the end of the semester, students will have acquired a solid understanding of these concepts, achieved through a combination of theoretical lectures, tutorials, homework assignments, and relevant reports.

Module 8

Code	Course/Module Title	ECTS	Semester
SEE151	Engineering Mechanics-Dynamics	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	72

Description

This course explores the fundamental principles of dynamics and their application in solving practical engineering problems. It develops students' proficiency in mathematical and physical analysis for kinematics and kinetics of particles and rigid bodies. Topics include linear and angular motion, translation, rotation, plane motion, and methods such as force–acceleration, work–energy, and impulse–momentum. The course also covers the determination of mass moments of inertia for solids and composite bodies.

Module 9

Code	Course/Module Title	ECTS	Semester
SEE152	Mathematics II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	72

Description

This course covers integral and differential calculus with applications. Topics include definite and indefinite integrals, area and volume calculations, arc length, surfaces of revolution, and centers of mass. It introduces transcendental functions, including logarithmic, exponential, inverse, trigonometric, and hyperbolic functions, and addresses L'Hospital's rule and relative growth rates. Integration techniques such as substitution, parts, trigonometric integrals, partial fractions, numerical integration, and improper integrals are covered, along with applications in probability. The course also introduces first-order differential equations, including solutions, slope fields, Euler's method, linear equations, systems of equations, phase planes, and their practical applications.

Module 10

Code	Course/Module Title	ECTS	Semester
SEE153	Engineering Drawing	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47

Description

This course offers an advanced introduction to engineering drawing for sustainable energy engineering using AutoCAD, focusing on precise geometric construction, projection methods, and professional presentation. It covers line types, curves, central and parallel projection theories, reference planes, and multi-view drawings, enabling students to create and link three-dimensional shapes through practical exercises and computer-aided techniques.

Module 11

Code	Course/Module Title	ECTS	Semester
SEE154	Environmental Pollution	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47

Description

This course examines environmental pollution and its effects on ecosystems, emphasizing the importance of sustainability and ecological balance. It addresses various types and sources of pollution, including air, water, soil, and thermal pollution, explores control and mitigation strategies, and highlights the role of renewable and green energy in minimizing environmental impact.

Module 12

Code	Course/Module Title	ECTS	Semester
SEE155	Chemistry	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37

Description

By the end of this course, students will be able to understand the fundamental structure of the atom and electron configurations and explain their role in determining the chemical properties of elements. They will apply key concepts of chemical composition, including the mole concept, formula mass, and stoichiometric relationships, to solve quantitative chemical problems. Students will also analyze and classify different types of chemical reactions, perform stoichiometric calculations, identify limiting reactants, and compute theoretical and percentage yields. Furthermore, they will demonstrate an understanding of energy changes in chemical reactions through topics such as thermochemistry, calorimetry, and applications of Hess's Law.

Module 13

Code	Course/Module Title	ECTS	Semester
UOM1021	English 1	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17

Description

The goal of this course is to correctly learn English grammar rules to help students build accurate and understandable sentences, thereby reducing misunderstandings and ensuring effective communication of the intended meaning. In addition, the course aims to improve writing skills, as grammar serves as the foundation for constructing cohesive and organized texts such as letters, reports, and essays. It also focuses on developing listening and reading skills, since understanding grammar enhances the ability to analyze spoken and written sentences, facilitating comprehension and the interpretation of complex texts. Furthermore, the course prepares students for academic and professional exams, emphasizing that knowledge of grammar is essential for success in many internationally recognized English language tests often required for study or employment.

Module 14

Code	Course/Module Title	ECTS	Semester
UOM1040	Democracy and Human Right	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17

Description

This course focuses on developing a comprehensive understanding of human rights, democracy, and anti-corruption principles. It examines the origins and classifications of human rights, the historical evolution of their recognition, and the legal, institutional, and societal mechanisms established to protect them. Students will explore the concept and forms of democracy, its fundamental principles and values, as well as the nature and impact of administrative corruption and strategies to promote transparency, accountability, and good governance. Through this study, learners will be equipped to actively uphold and advocate for human rights and democratic practices within their communities.

Contact

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