



Program Matrix

Faculty		Engineering									
Program		Chemical Engineering									
Award		Bachelor of Engineering in Chemical Engineering									
Credit Hours		133 Credit Hours									
Academic Year		Cohort 2026/2027 Onwards									
Year	Semester 1					Semester 2					Semester 3
	Course Code	Course Name	Pre-requisite	Core/ Elective	Credit Hours	Course Code	Course Name	Pre-requisite	Core/ Elective	Credit Hours	
1	CHEM1020	General Chemistry	None	Core	4	ELEC1100	Principles of Electrical Circuits	MATH1010	Core	4	The student is allowed to register 2 courses (not exceeding 9 credit hours)
	COMP1500	Introduction to Programming	IC3M2	Core	4	ENGG1010	Applied Mechanics	MATH1010	Core	4	
	ENGG1013	Engineering Drawing and Computer Drafting	None	Core	2	ENGG1023	Engineering Materials	None	Core	4	
	MATH1010	Calculus I	SET3	Core	4	MATH1200	Calculus II	MATH1010	Core	4	
	UNIR1100	Communication Skills (1)	None	Core	3	UNIR1003	Oman the State and People	IC3M1A	Core	2	
2	CHEM2000	Chemistry for Engineers	None	Core	4	CHEM2002	Process System Analysis	None	Core	4	The student is allowed to register 2 courses (not exceeding 9 credit hours)
	ELEC2113	Instrumentation & Measurement	ELEC1100	Core	4	CHEM2004	Fundamental of Fluid Mechanics	None	Core	4	
	CHEM2001	Introduction of Chemical Engineering	None	Core	4	CHEM2056	Physical & Surface Chemistry	CHEM1020	Core	4	
	MATH2200	Differential Equations and Statistics	MATH1200	Core	4	UNIR2001	Entrepreneurship	None	Core	2	
	UNIR1002	Arabic Language Skills	SET 1A	Core	2	UNIR2100	Communication Skills (2)	UNIR1100	Core	3	
		Diploma Internship									



3	CHEM3000	Heat Transfer	None	Core	4	CHEM3010	Process Modelling and Dynamics	None	Core	4	The student is allowed to register 2 courses (not exceeding 9 credit hours)
	CHEM3008	Chemical Process Industries	None	Core	4	CHEM3012	Separation Processes (2)	None	Core	4	
	CHEM3011	Separation Processes (I)	None	Core	4	CHEM3003	Process Engineering Thermodynamics	None	Core	4	
	ENGG3700	Numerical Analysis and Optimization	MATH2200	Core	4	UNIR3100	Communication Skills (3)	UNIR2100	Core	3	
4	CHEM4004	Process and Control System Design	CHEM3010	Core	4	CHEM4007B	Process Design Practice	None	Core	4	The student is allowed to register 2 courses (not exceeding 9 credit hours)
	CHEM4005	Reaction Engineering	CHEM3003	Core	4	CHEM4015	Waste Treatment Processes	None	Core	4	
	CHEM4007A	Process Design Practice	None	Core	4	ENGG4000	Renewable & Sustainable Energy	None	Core	4	
	ENGG4801A	Final Year Project (A)	75% of Level 3 courses	Core	4	ENGG4801B	Final Year Project (B)	ENGG4801A	Core	4	
		Bachelor Internship									
Bachelor Award: Internship course (or an equivalent) is a mandatory requirement for students exiting at Bachelor level (and haven't completed it at Diploma level). The internship course is non-credit-bearing and must be successfully completed to fulfill program requirements.											

Level 1

CHEM1020

This introductory course in general chemistry covers the fundamental principles of chemistry, including the conversion of units, naming compounds, and writing chemical formulas. Students will learn how to balance chemical equations and apply stoichiometry to solve problems related to chemical reactions. The course also introduces the concepts of molarity and molality for solution concentration calculations. Throughout, emphasis is placed on developing a strong foundation in the mathematical and theoretical aspects of chemistry, providing students with the skills necessary for further study in chemistry and related fields.

COMP1500

This course introduces students to C++ programming for solving a well-defined engineering problem through algorithmic and structured coding. Students will gain practical experience in developing programs using variables, selection, loops, arrays, functions, and mathematical expressions. Emphasis is placed on hands-on computer lab activities that enhance problem-solving skills, and program design. The course provides a strong foundation for applying C++ in engineering and computational applications.

ENGG1013

The course covers a broad range of engineering drawings utilizing free-hand sketching, engineering drawing, and computer-aided drafting and solid modelling. The fundamental principles of orthographic projection as well as the topics of dimensioning, sectional views, isometric and perspective pictorial views. In addition, Computer Aided Drafting is also covered and practiced using AutoCAD.

MATH1010

This course covers basic mathematics, including functions, limits, derivatives, integration, complex numbers, vectors, and applicable methods. Furthermore, this course also includes theories and applications of integration, derivatives, complex numbers, and vectors.

UNIR1100

In this course, students learn to employ reading strategies while reading faculty related texts, use paraphrasing techniques, produce a short project proposal and make a poster presentation related to their specialization.

ELEC1100

This course introduces students to a wide range of DC electrical circuit analysis techniques, which will provide the necessary foundation for electrical engineering courses. In this course, students apply Kirchhoff's laws, and nodal and mesh analysis techniques to solve electrical circuit parameters. Students will also be taught how to use important theorems such as superposition, Thevenin, and Norton in circuit analysis. In addition, it teaches the student to calculate the quantities of alternating current AC signals. It introduces the course to the analysis of alternating current circuits which include resistors, inductors, and capacitors.

ENGG1010

This course is designed primarily for all engineering students. It provides comprehensive knowledge and insight into the study of Mechanics. Topics to be covered include Vectors, operations with forces, resultants of coplanar force systems. Equilibrium and coplanar force systems. Newton's laws of motion and their applications, Friction and its applications. Kinetic energy. Kinematics of a particle, composition and resolution of velocities and accelerations, relative velocity and acceleration, representation by vectors. Plane Kinematics of rigid body, angular velocity diagrams applied to simple mechanisms.

ENGG1023

This course covers a broad range of fundamental principles of material sciences and its key role in the selection and utilization of materials for various engineering applications. Course topics include crystal structure and defects, mechanical and electrical properties, phase diagram, corrosion and materials processing. Overall, engineering materials is an important course that lays the foundation for several other courses in engineering and provides students with essential knowledge for their higher levels.

MATH1200

This course offers a foundational study of basic linear algebra and vector calculus, with emphasis on mathematical methods and techniques that are broadly applicable across various scientific and engineering fields. Students will develop a strong understanding of core mathematical concepts and gain the ability to apply these tools to solve problems from a wide range of real-world applications. The course also includes an introduction to series topics, enhancing analytical skills, and mathematical reasoning.



UNIR1003

يشتمل هذا المقرر على نطاق عريض من المعارف والمهارات والقيم التي تعزز وعي الطلبة بهوية المجتمع العماني وقيمته، وفهم دور المتغيرات التراثية والتاريخية والديمقراطية والثقافية والمؤسسية في تشكيل الهوية العمانية وتحديد سماتها. ويركز المقرر على التنظيم الإداري للدولة، ومنطلقات النهضة العمانية المعاصرة ومؤشراتها من خلال تسليط الضوء على فكر حضرة صاحب الجلالة السلطان هيثم بن طارق المعظم، ويركز المقرر أيضا على تعزيز قيم الانتماء والولاء والمواطنة وعلاقتها بحقوق الإنسان، والتعريف بعلاقة السلطنة بمحيطها الخليجي والعربي والإقليمي والدولي بما في ذلك المواثيق الدولية، بالإضافة إلى تسليط الضوء على الأمن الفكري والتحديات المعاصرة، ودور مؤسسات الدولة المدنية والعسكرية في خدمة الوطن..

Level 2

CHEM2000

This course defines the foundation for the phenomena/concepts of physical and organic chemistry by introducing intermolecular forces, the properties of liquids covering significant hydrocarbons, and the synthesis and reaction mechanisms of various functional groups.

ELEC2113

This course includes a significant knowledge of measurement and instrumentation systems. In this course, the students will understand the scope of the transducer and sensors operation, the data Acquisition system, and signal processing. In addition, it will improve the students' understanding of the construction and application of the indicating meters. It allows the student to develop a skill to solve problems related to instrumentation systems and data acquisition systems.

CHEM2001

This course introduces the significant knowledge of analysis tools of process engineers-mass and energy balance. It also exposes students to the way process engineers work, think and communicate their ideas. It is the corner stone course for all process engineering disciplines and introduces students to teaching and learning approaches in the division of Chemical Engineering

MATH2200

This course aims to introduce four major topics to engineering students namely: 1st order and 2nd order basic differential equations, Laplace Transform and partial differential equations (PDEs), descriptive statistics and data presentation, and probability concepts.

UNIR1002

يتناول هذا المقرر عددا من القضايا النحوية والصرفية والإملائية والبلاغية التي تسهم في إكساب المهارات اللغوية. هذه القضايا تتعلق بأقسام الكلام، وأنواع الإعراب، والجملة الاسمية، والجملة الفعلية، ومكملات الجملة، والخبر والإنشاء. ويعقب هذا القضايا نصوص تطبيقية مختارة، مع التركيز على تنمية المهارات اللغوية الأساسية (الاستماع، والقراءة، والكتابة، والتحدث).

CHEM2002

The course introduces a systems approach to understanding and analyzing the structure and morphology of industrial chemical processes. The context and needs that give rise to process systems are examined along with the concepts of unit operations. Understanding the nature of individual units and complex flowsheets is done through analysis of degrees of freedom solvability issues. Techniques for the decomposition of large, complex systems to smaller problems are developed. Application of computer-aided flow sheeting tools facilitate process analysis, process calculations which include economic environmental impacts.

CHEM2004

This is an introductory course on the fundamentals of fluid mechanics and their applications to engineering problems. The lessons that covered in this course include dimensional analysis, viscosity, shear stress and shear strain, pressure, conservation of mass, ideal and viscous fluid in a pipe, pumps and net positive suction head.

CHEM2056

Physical & Surface chemistry course explains how to understand matter by observing how it behaves under different conditions and how it interacts with its environment. It underpins a number of other areas of science, including materials science, nanotechnology and biotechnology. This subject covers a number of key areas of physical chemistry, focusing on thermochemistry, rates of chemical reactions, acid-base and ionic equilibria, the properties of surfaces and phase changes.

UNIR2001

This course is an introductory course in entrepreneurship and innovation. The course aims to expose undergraduate students of various academic backgrounds to business venturing and entrepreneurial activity. The course focuses on boosting the concept of entrepreneurship which leads the small businesses. Students will apply themselves through developing their own business ideas and assessing them using knowledge and skills acquired during the course.

UNIR2100

The aim of this English for Academic Purposes (EAP) course is to introduce students to topics from various disciplines of Engineering, Computer & Information Technology and Business, as offered in the faculties, using authentic reading texts and videos. The course also aims to enhance students' Academic English skills with a particular focus on academic reading and writing. In addition, the course focuses on developing academic and technical vocabulary, core grammatical structures, and summarizing skills.

Level 3

CHEM3000

The course aims to provide the students with the background necessary to understand the fundamentals of heat transfer and its applications so that they are able to solve heat transfer calculations and design equipment for industrial applications.

CHEM3008

This course introduces and explores chemical engineering principles and concepts as they are applied to the chemical and petrochemical process industries, with a focus on the industries within the Sultanate of Oman.

CHEM3011

Diffusion, convective and interfacial mass transfer, and its application to continuous contact operations. Design of equilibrium-stage separation processes including distillation, gas-liquid absorption and stripping, liquid-liquid extraction, leaching and humidification.

ENGG3700

This course introduces the student to the use of numerical methods for solving engineering problems with the aid of a digital computer. The course contains numerical methods for solving non-linear equations, optimization, curve fitting and interpolation, integration of data and functions, and solving ordinary and partial differential equations. MATLAB will be used as the programming language.

CHEM3010

This course builds on the knowledge learned in Mathematical process modeling for design and control. Conservation principles, development of constitutive equations in models & analysis of resultant models for use in control & diagnosis of process faults. Model verification, calibration & validation based on process data.

CHEM3012

One of the basic steps in Chemical Engineering and Industry is the Separation process. This course covers theories, concepts and application of separation techniques in the industry. The course will introduce the most common unit operations in the chemical industry including evaporation, drying, fluid mixing, and adsorption.

CHEM3003

This course provides an insight into the principles, concepts, and laws/postulates of process engineering thermodynamics to applications that require quantitative knowledge of thermodynamic properties from a macroscopic to a molecular level. It covers topics including Mass and Energy balances, Equations of state, Thermodynamic properties of pure components and mixtures, Phase and Chemical reaction equilibria.

UNIR3100

The purpose of the course is to enhance students' performance-based competence, and equip them with the necessary academic research writing skills required to undertake an independent research project. It further develops academic writing skills including paraphrasing, summarizing, synthesizing, direct quotation and APA style citation.

Level 4

CHEM4004

The dynamic behavior and automatic control of processes are studied. Mathematical tools for analyzing the transient behavior of open and closed-loop systems are presented. The steps of controller development are treated: process characterization (using mathematical models), controller design, and implementation. Methods for assessing system stability and performance are investigated and are used in the design of controllers. Frequency response methods are introduced, as is the development and implementation of controller enhancements including feedforward and cascade control.

CHEM4005

Reaction engineering deals with the performance analysis and design of equipment for carrying out chemical reactions. The analysis involves principles of chemical kinetics, thermodynamics, heat and mass transfer as well as fluid mechanics. The present course covers basic principles of chemical kinetics and reaction equilibrium, various ideal reactors in which the complexities arising from resistances associated with fluid flow as well as heat and mass transfer. Design procedures for reactors including batch, semi batch and continuous reactors are covered.

CHEM4007A

This capstone course will consolidate the necessary skills and knowledge for a working chemical engineer by carrying out an industrial process design and developing an Engineering Design Document. The students will develop competency in the following: Process selection and synthesis, the use and recognition of the limitations of process simulation software, development of Piping and Instrumentation diagrams, analysis of Process Safety, equipment sizing, materials selection, and Capital, Operating Cost and economic analysis along with optimization.

ENGG4801A

Students from the four engineering disciplines, Chemical, Civil, Mechanical and Mechatronic, and Electrical and Computer Engineering, undertake a two-part Final Year Project consisting of ENGG4801A (the initial phase) and ENGG4801B (the final phase). These supervised projects allow students to investigate practical engineering problems and apply the knowledge and skills gained throughout their studies. ENGG4801A provides the foundation for the research sequence. In this phase, students identify a problem, review relevant literature, define research objectives, and outline suitable research methods. They also conduct preliminary analyses and planning as required for their project. Alongside technical tasks, students develop skills in teamwork, communication, ethics, creativity, and independent learning. The phase concludes with the submission of the ENGG4801A report and an oral presentation that meets academic requirements.

CHEM4007B

This capstone course will consolidate the necessary skills and knowledge for a working chemical engineer by carrying out an industrial process design and developing an Engineering Design Document. The students will develop competency in the following: engineering and economic analysis of integrated chemical processes, equipment, and systems. Comprehensive integrated plant design is delivered. Optimal design, Profitability. Methods of analyzing risk are provided, and the basic types of health, safety, and environmental regulations are explained, with references to government databases. The assessment of plant safety is introduced through their relationships to hazard and operability (HAZOP) studies, the Dow Fire and Explosion Index, the Dow Chemical Hazards Index and to life-cycle analysis. Ethics and professionalism. The aim of the course is to prepare students for technical positions in industry by solving a series of open-ended engineering design challenges, emphasizing on process synthesis, design of equipment and processes to meet specified needs with appropriate attention to health and safety analyses, sustainability and environmental stewardship, regulatory constraints, and assessments of process operability and economics.

CHEM4015

The course introduces students to the fundamental theories that govern water and wastewater. It covers the application of a selected set of design and analysis methods to the calculation of drinking water and wastewater systems, as well as the treatment of wastewater.

ENGG4000

The course establishes the fundamentals of energy and sustainable development, renewable and nonrenewable energy, energy systems, climate change and energy, life cycle analysis, energy conservation and optimization, sustainability and business, energy storage and management.

ENGG4801B

ENGG4801B builds on the groundwork established in ENGG4801A by focusing on the complete execution of the research plan. Students conduct experiments, collect and analyze data, and interpret their findings through structured results, discussions, and evidence-based conclusions. Beyond the technical outputs, ENGG4801B fosters creativity, ethical practice, teamwork, and entrepreneurial awareness by encouraging students to link their research outcomes to real-world engineering applications. By the end of the sequence, students gain deep research capabilities and the confidence to tackle complex engineering challenges, contribute to innovation, and continue growing professionally. They produce the ENGG4801B report and deliver oral presentations aligned with academic expectations.

Internship Course:

This course provides students with the opportunity to apply the knowledge and skills acquired during their studies in a workplace environment, enhance their career readiness, and develop their professional and practical competencies in alignment with the program learning outcomes and labour market requirements. The course is a compulsory component of the academic program, where applicable, depending on the nature of the program. It is governed by the University's approved policies and procedures and is supervised by academic staff in collaboration with the host training organisations. The specific requirements, duration, and assessment methods vary according to the academic program.