جامعة صحار
Sohar University

# Faculty of Engineering Programs Booklet

## Academic Year 2025-2026

جامعة صحار
Sohar University

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## Message from the Dean

Assalamualaikum Warahmatullahi Wabarakatuh and Greetings

Welcome to the Faculty of Engineering at Sohar University.

It gives me great pleasure to welcome you to a community that is passionate about learning, innovation, and making a difference. The Faculty of Engineering plays a key role in driving Sohar University's vision of academic excellence and preparing graduates who are ready to shape the future.

At the Faculty of Engineering, our priority is simple: you and your learning journey. We are committed to creating an environment where every student feels supported, challenged, and inspired, whether through strong theoretical foundations, hands-on learning, or meaningful research opportunities.

We take great pride in offering internationally accredited Bachelor's programs, recognised by Engineers Australia, which speaks to the quality and global standing of our curriculum. Alongside these, our PhD in Engineering and Master of Engineering in Environmental Engineering programs open the door to deeper exploration, innovative ideas, and impactful research that addresses real-world challenges.

Learning here extends well beyond the classroom. Our students gain valuable practical experience through training placements at respected facilities such as Grace Catalysis Labs and Intaj Suhar. Within our campus, our modern, well-equipped laboratories serve as vibrant spaces where creativity, innovation, and discovery thrive. We are also fortunate to enjoy strong partnerships with industry. These collaborations allow us to work on meaningful projects that drive technological advancement, contribute to Oman's development, and create positive change in our communities. Across our faculty—staff, students, and alumni, there is a shared passion for sustainability, innovation, and service.

Guided by the United Nations Sustainable Development Goals (UN SDGs), we continue encouraging research and entrepreneurial thinking that respond to both global and local needs, helping shape a more sustainable and prosperous future.

On behalf of the Faculty of Engineering, I warmly invite you to be part of this exciting journey of learning, growth, and innovation. We look forward to supporting you every step of the way and wish you great success in your studies and future endeavours.
Wishing you every success!

Professor Wan Hamidon Wan Badaruzzaman
Dean
Faculty of Engineering

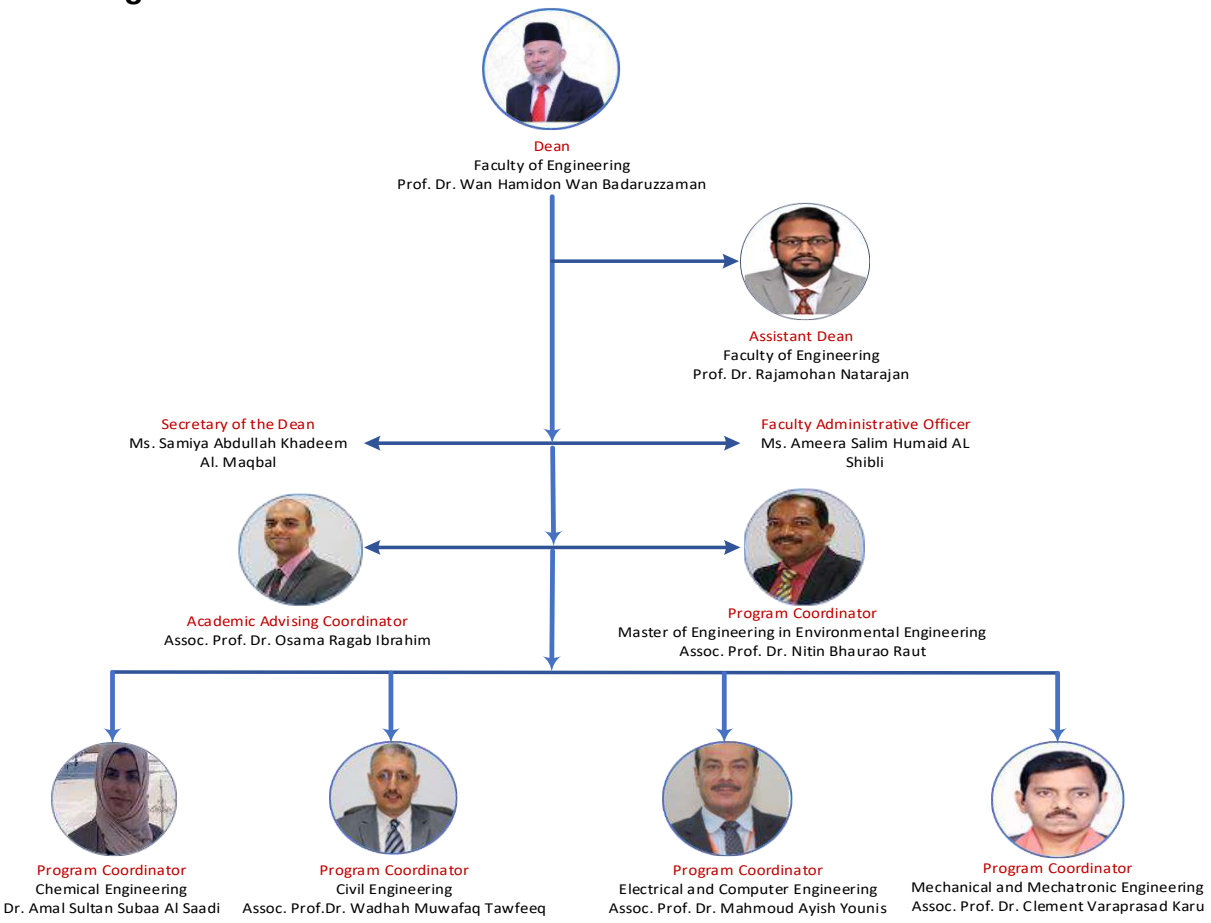
## About the Faculty

The Faculty of Engineering at Sohar University is one of the most prominent and research-active faculties at the institution, renowned for its strong legacy of delivering academically rigorous, industry-relevant programs. Currently, the faculty offers a diverse range of programs, including four Bachelor's degrees in key engineering disciplines, a Master's program in Environmental Engineering, and a PhD in Engineering. All undergraduate programs are fully accredited by Engineers Australia, reflecting the faculty's commitment to international standards of excellence. Students benefit from learning under the guidance of experienced academics and accomplished researchers, gaining hands-on exposure through practical training, cutting-edge laboratories, and research-driven projects. Graduates from the Faculty of Engineering have gone on to establish successful careers in leading national and international companies. In a dynamic, supportive learning environment, the faculty is dedicated to equipping students with the skills and knowledge needed for a successful career in engineering. Join us for a prosperous future.

Programs offered by the Faculty of Engineering:

- PhD in Engineering
- Master of Engineering in Environmental Engineering
- Bachelor of Engineering: Chemical Engineering (CHE)
- Bachelor of Engineering: Civil Engineering (CVE)
- Bachelor of Engineering: Electrical and Computer Engineering (ECE)
- Bachelor of Engineering: Mechanical and Mechatronic Engineering (MME)

## FE Management Chart



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# CHEMICAL ENGINEERING (CHE)

| | |
|---|---|
| Program Name | **Chemical Engineering** |
| Award | Bachelor of Engineering<br>Chemical Engineering |
| Exit point | Diploma |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 4 Academic Years Minimum |
| Credit Units / Hours | 69 Credit Units / 133 Credit Hours |
| Professional Body Accreditation | Full Accreditation by Engineers Australia |
| Entry Requirement | • Completed the General Education Diploma in Oman, or equivalent (formerly Secondary School Completion Certificate), and<br>• Obtained at least a pass mark of 50% or equivalent in Advanced Mathematics, Physics, and/or Chemistry. |

## Program Aim

The Chemical Engineering program aims to graduate engineers who are capable of working in the fields of Chemical Engineering with high technical, communication, teamwork, and leadership skills.

## Program Objectives (POs)

**PO1:** Engineers who can successfully work in Chemical Engineering or related disciplines.

**PO2:** Engineers who act ethically and professionally in modern diverse work environments and communities through effective communication, leadership, and responsible teamwork.

**PO3:** Engineers who pursue post-graduate studies and/or professional development in Chemical Engineering or related disciplines to sustain and advance their careers.

## Program Learning Outcomes (PLOs) for Bachelor Exit Award

**PLO1:** Apply advanced knowledge of engineering, science, and mathematics for solving Chemical Engineering problems.

**PLO2:** Design specialized engineering system solutions for complex problems related to Chemical Engineering.

**PLO3:** Communicate effectively on complex engineering activities, with adaptation for appropriate audiences.

**PLO4:** Utilize a wide range of numerical skills for solving complex Chemical Engineering problems.

**PLO5**: Use a wide range of information and communication technology tools and techniques in the discipline of Chemical Engineering.

**PLO6:** Practice highly advanced levels of ethical principles and values in the fields of Chemical Engineering.

**PLO7:** Develop advanced leadership and teamworking skills to establish goals and meet objectives with full accountability.

**PLO8:** Apply highly specialized entrepreneurial and employability skills suitable for work environment.

**PLO9:** Implement lifelong learning independently for integration of new knowledge using appropriate learning strategies.

## Program Learning Outcomes (PLOs) for Diploma Exit Award

**PLO1:** Apply significant knowledge of engineering, science, and mathematics for solving Chemical Engineering problems.

**PLO2**: Prepare solutions for well-defined tasks related to Chemical Engineering.

**PLO3**: Communicate appropriately on well-defined engineering activities, with diverse audiences.

**PLO4:** Apply a broad range of numerical skills for solving Chemical Engineering problems.

**PLO5:** Utilize a range of information and communication technology tools and techniques in the discipline of Chemical Engineering.

**PLO6:** Practice significant levels of ethical principles and values in the fields of Chemical Engineering.

**PLO7**: Develop leadership and teamwork skills with full accountability for achieving goals and objectives.

**PLO8:** Employ substantial entrepreneurial and employability skills in a work environment.

**PLO9:** Identify the need for lifelong learning in the context of technological change related to Chemical Engineering.

## Study Plan

**Curriculum Structure**

| Year/ Level | Semester | Course Code | Course Title | Type | Pre-requisites | Credit Unit/ Hour | OQF Level | OQF Credit Hour |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | CHEM1020 | General Chemistry | Compulsory | None | 2/4 | 5 | 4 |
| | | COMP1500 | Introduction to Programming | Compulsory | IC3M2 | 2/4 | 5 | 4 |
| | | ENGG1013 | Engineering Drawing and Computer Drafting | Compulsory | None | 1/2 | 5 | 2 |
| | | MATH1010 | Calculus I | Compulsory | SET3 | 2/4 | 5 | 4 |
| | | UNIR1100 | Communication Skills (1) | Compulsory | None | 2/3 | 5 | 3 |
| | 2 | ELEC1100 | Principles of Electrical Circuits | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1010 | Applied Mechanics | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1023 | Engineering Materials | Compulsory | None | 2/4 | 5 | 4 |
| | | MATH1200 | Calculus II | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | UNIR1001 | Oman and Islamic Culture | Compulsory | IC3M1A | 1/2 | 5 | 2 |
| 2 | 1 | CHEM2000 | Chemistry for Engineers | Compulsory | None | 2/4 | 5 | 4 |
| | | CHEM2001 | Introduction to Chemical Engineering | Compulsory | None | 1/2 | 5 | 2 |
| | | ELEC2113 | Instrumentation & Measurement | Compulsory | ELEC1100 | 2/4 | 6 | 4 |
| | | MATH2200 | Differential Equations and Statistics | Compulsory | MATH1200 | 2/4 | 6 | 4 |
| | | UNIR1002 | Arabic Language Skills | Compulsory | SET 1A | 1/2 | 6 | 2 |
| | 2 | CHEM2002 | Process System Analysis | Compulsory | None | 2/4 | 6 | 4 |
| | | CHEM2004 | Fundamentals of Fluid Mechanics | Compulsory | None | 1/2 | 6 | 2 |
| | | CHEM2056 | Physical & Surface Chemistry | Compulsory | CHEM1020 | 2/4 | 6 | 4 |
| | | UNIR2001 | Entrepreneurship | Compulsory | None | 2/2 | 6 | 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | UNIR2100 | Communication Skills (2) | Compulsory | UNIR1100 | 2/3 | 6 | 3 |
| **Diploma Exit Award** | | | | | | **37/70** | **6** | **70** |
| 3 | 1 | CHEM3000 | Heat Transfer | Compulsory | None | 2/4 | 7 | 4 |
| | | CHEM3008 | Chemical Process Industries | Compulsory | None | 2/4 | 7 | 4 |
| | | CHEM3011 | Separation Processes (I) | Compulsory | None | 2/4 | 7 | 4 |
| | | ENGG3700 | Numerical Analysis and Optimization | Compulsory | MATH2200 | 2/4 | 7 | 4 |
| | 2 | CHEM3010 | Process Modelling and Dynamics | Compulsory | None | 2/4 | 7 | 4 |
| | | CHEM3012 | Separation Processes (2) | Compulsory | None | 2/4 | 7 | 4 |
| | | CHEM3003 | Process Engineering Thermodynamics | Compulsory | None | 2/4 | 7 | 4 |
| | | UNIR3100 | Communication Skills (3) | Compulsory | UNIR2100 | 2/3 | 7 | 3 |
| 4 | 1 | CHEM4004 | Process and Control System Design | Compulsory | CHEM3010 | 2/4 | 8 | 4 |
| | | CHEM4005 | Reaction Engineering | Compulsory | CHEM3003 | 2/4 | 8 | 4 |
| | | CHEM4007A | Process Design Practice | Compulsory | None | 2/4 | 8 | 4 |
| | | ENGG4801A | Final Year Project (A) | Compulsory | 75% of Level 3 courses | 2/4 | 8 | 4 |
| | 2 | CHEM4007B | Process Design Practice | Compulsory | None | 2/4 | 8 | 4 |
| | | CHEM4015 | Waste Treatment Processes | Compulsory | None | 2/4 | 8 | 4 |
| | | CHEM4020 | Renewable & Sustainable Energy | Compulsory | None | 2/4 | 8 | 4 |
| | | ENGG4801B | Final Year Project (B) | Compulsory | ENGG4801A | 2/4 | 8 | 4 |
| **Bachelor Exit Award** | | | | | | **69/133** | **8** | **133** |

## Course Description

### Level 1

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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.

Course 6 code: 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.

Course 7 code: 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.

Course 8 code: 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.

Course 9 code: 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.

Course 10 code: UNIR1001
يشتمل هذا المقرر على تعريف الثقافة الإسلامية، وأهميتها، ومصادرها وخصائصها، ومقوماتها، والمعالم التي امتازت بها، ودورها في بناء الشخصية المسلمة، وبيان كيفية مواجهة التحديات المعاصرة التي تعصف بالأمة المسلمة، وأساليب الغزو الفكري، كما يستعرض إسلام أهل عمان، وأبرز ملامح الثقافة الإسلامية في المجتمع العماني، ودور العمانيين في بناء الحضارة الإسلامية ونشر الإسلام، وإسهاماتهم في المجالين التجاري والحضاري.

**Level 2**

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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 نصوصتطبيقية مختارة، مع التركيز على تنمية المهارات اللغوية الأساسية (الاستماع، والقراءة، والكتابة، والتحدث).

Course 6 code: 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.

Course 7 code: 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.

Course 8 code: 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.

Course 9 code: 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.

Course 10 code: 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**

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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.

Course 6 code: 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.

Course 7 code: 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.

Course 8 code: 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**

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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.

Course 6 code: 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.

Course 7 code: CHEM4020

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.

Course 8 code: 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.

# CIVIL ENGINEERING (CVE)

| | |
|---|---|
| Program Name | **Civil Engineering** |
| Award | Bachelor of Engineering<br>Civil Engineering |
| Exit point | Diploma |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 4 Academic Years Minimum |
| Credit Units / Hours | 69 Credit Units / 133 Credit Hours |
| Professional Body Accreditation | Full Accreditation by Engineers Australia |
| Entry Requirement | • Completed the General Education Diploma in Oman, or equivalent (formerly Secondary School Completion Certificate), and<br>• Obtained at least a pass mark of 50% or equivalent in Advanced Mathematics, Physics, and/or Chemistry. |

## Program Aim

The Civil Engineering program aims to graduate engineers who are capable of working in the fields of Civil Engineering with high technical, communication, teamwork and leadership skills.

## Program Objectives (POs)

**PO1:** Engineers who can successfully work in Civil Engineering or related disciplines.

**PO2:** Engineers who act ethically and professionally in modern diverse work environments and communities through effective communication, leadership, and responsible teamwork.

**PO3:** Engineers who pursue post-graduate studies and/or professional development in Civil Engineering or related disciplines to sustain and advance their careers.

## Program Learning Outcomes (PLOs) for Bachelor Exit Award

| |
|---|
| **PLO1:** Apply advanced knowledge of engineering, science, and mathematics for solving Civil Engineering problems. |
| **PLO2**: Design specialized engineering system solutions for complex problems related to Civil Engineering. |
| **PLO3:** Communicate effectively on complex engineering activities, with adaptation for appropriate audiences. |
| **PLO4:** Utilize a wide range of numerical skills for solving complex Civil Engineering problems. |
| **PLO5:** Use a wide range of information and communication technology tools and techniques in the discipline of Civil Engineering. |
| **PLO6:** Practice highly advanced levels of ethical principles and values in the fields of Civil Engineering. |
| **PLO7:** Develop advanced leadership and teamworking skills to establish goals and meet objectives with full accountability. |
| **PLO8:** Apply highly specialized entrepreneurial and employability skills suitable for work environment. |
| **PLO9:** Implement lifelong learning independently for integration of new knowledge using appropriate learning strategies. |

## Program Learning Outcomes (PLOs) for Diploma Exit Award

| |
|---|
| **PLO1:** Apply significant knowledge of engineering, science, and mathematics for solving Civil Engineering problems |
| **PLO2:** Prepare solutions for well-defined tasks related to Civil Engineering. |

| | |
|---|---|
| **PLO3:** | Communicate appropriately on engineering activities, with diverse audiences |
| **PLO4:** | Utilize a broad range of numerical skills for solving Civil Engineering problems. |
| **PLO5:** | Use a range of information and communication technology tools and techniques in the discipline of Civil Engineering. |
| **PLO6:** | Practice significant levels of ethical principles and values in the fields of Civil Engineering. |
| **PLO7:** | Develop leadership and teamwork skills with full accountability for achieving goals and objectives. |
| **PLO8:** | Employ substantial entrepreneurial and employability skills in a work environment. |
| **PLO9:** | Identify the need for lifelong learning in the context of technological change related to Civil Engineering. |

## Study Plan

**Curriculum Structure**

| Year/ Level | Semester | Course Code | Course Title | Type | Pre-requisites | Credit Unit/ Hour | OQF Level | OQF Credit Hour |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | CHEM1020 | General Chemistry | Compulsory | None | 2/4 | 5 | 4 |
| | | COMP1500 | Introduction to Programming | Compulsory | IC3M2 | 2/4 | 5 | 4 |
| | | ENGG1013 | Engineering Drawing and Computer Drafting | Compulsory | None | 1/2 | 5 | 2 |
| | | MATH1010 | Calculus I | Compulsory | SET3 | 2/4 | 5 | 4 |
| | | UNIR1100 | Communication Skills (1) | Compulsory | None | 2/3 | 5 | 3 |
| | 2 | ELEC1100 | Principles of Electrical Circuits | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1010 | Applied Mechanics | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1023 | Engineering Materials | Compulsory | None | 2/4 | 5 | 4 |
| | | MATH1200 | Calculus II | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | UNIR1001 | Oman and Islamic Culture | Compulsory | IC3M1A | 1/2 | 5 | 2 |
| 2 | 1 | CIVE2610 | Introduction to Civil Engineering and Environmental Issues | Compulsory | None | 2/4 | 6 | 4 |
| | | CIVE2710 | Surveying | Compulsory | None | 2/4 | 6 | 4 |
| | | CIVE2310 | Strength of Materials | Compulsory | ENGG1010 | 2/4 | 6 | 4 |
| | | MATH2200 | Differential Equations and Statistics | Compulsory | MATH1200 | 2/4 | 6 | 4 |
| | | UNIR1002 | Arabic Language Skills | Compulsory | SET 1A | 1/2 | 6 | 2 |
| | 2 | CIVE2320 | Introduction to Structural Analysis and Design | Compulsory | ENGG1010 | 2/4 | 6 | 4 |
| | | CIVE2210 | Fundamentals of Engineering Geology and Soil | Compulsory | None | 2/4 | 6 | 4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Mechanics | | | | | |
| | | CIVE2120 | Fundamentals of Fluid Mechanics | Compulsory | None | 2/4 | 6 | 4 |
| | | UNIR2001 | Entrepreneurship | Compulsory | None | 2/2 | 6 | 2 |
| | | UNIR2100 | Communication Skills (2) | Compulsory | UNIR1100 | 2/3 | 6 | 3 |
| **Diploma Exit Award** | | | | | | **37/70** | **6** | **70** |
| 3 | 1 | CIVE3340 | Structural Analysis | Compulsory | CIVE2320 | 2/4 | 7 | 4 |
| | | CIVE3360 | Structural Steel Design | Compulsory | CIVE2320 | 2/4 | 7 | 4 |
| | | CIVE3110 | Hydrology | Compulsory | None | 2/4 | 7 | 4 |
| | | ENGG3700 | Numerical Analysis and Optimization | Compulsory | MATH2200 | 2/4 | 7 | 4 |
| | 2 | CIVE3350 | Design of Reinforced Concrete Structures | Compulsory | CIVE2320 | 2/4 | 7 | 4 |
| | | CIVE3220 | Geotechnical Engineering | Compulsory | CIVE2210 | 2/4 | 7 | 4 |
| | | CIVE3410 | Traffic and Transportation Engineering | Compulsory | None | 2/4 | 7 | 4 |
| | | UNIR3100 | Communication Skills (3) | Compulsory | UNIR2100 | 2/3 | 7 | 3 |
| 4 | 1 | CIVE4510A | Civil Engineering Design | Compulsory | CIVE3350 | 2/4 | 8 | 4 |
| | | CIVE4130 | Water Resources Engineering | Compulsory | None | 2/4 | 8 | 4 |
| | | CIVE4810 | Project Management | Compulsory | None | 2/4 | 8 | 4 |
| | | ENGG4801A | Final Year Project (A) | Compulsory | 75% of Level 3 courses | 2/4 | 8 | 4 |
| | 2 | CIVE4420 | Highway Engineering and Road Safety | Compulsory | None | 2/4 | 8 | 4 |
| | | CIVE4140 | Waste Treatment Processes | Compulsory | None | 2/4 | 8 | 4 |
| | | CIVE4510B | Civil Engineering Design | Compulsory | CIVE3350 | 2/4 | 8 | 4 |
| | | ENGG4801B | Final Year Project (B) | Compulsory | ENGG4801A | 2/4 | 8 | 4 |
| **Bachelor Exit Award** | | | | | | **69/133** | **8** | **133** |

## Course Description

### Level 1

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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.

Course 6 code: 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.

Course 7 code: 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.

Course 8 code: 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.

Course 9 code: 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.

Course 10 code: UNIR1001

يشتمل هذا المقرر على تعريف الثقافة الإسلامية، وأهميتها، ومصادرها وخصائصها، ومقوماتها، والمعالم التي امتازت بها، ودورها في بناء الشخصية المسلمة، وبيان كيفية مواجهة التحديات المعاصرة التي تعصف بالأمة المسلمة، وأساليب الغزو الفكري، كما يستعرض إسلام أهل عمان، وأبرز ملامح الثقافة الإسلامية في المجتمع العماني، ودور العمانيين في بناء الحضارة الإسلامية ونشر الإسلام، وإسهاماتهم في المجالين التجاري والحضاري.

**Level 2**

Course 1 code: CIVE2610
This course introduces the students to the practice of civil engineering and its branches, types and selection of construction materials for civil engineering purposes, construction techniques, civil engineering drawing, quantity surveys and team working skills. Also introduces the students to environmental issues & their management, the environmental population, and the adverse effects of the environment on civil engineering projects and vice versa.

Course 2 code: CIVE2710
This is an introductory course in understanding the scope and nature of surveying equipment use and surveying computations. Identification and applying the main methodologies and appropriate tools of Practical components include significant knowledge of taking survey field notes, levelling, using an automatic level, and traversing using total station instrument

Course 3 code: CIVE2310
This course describes the relationship between stress and strain in deformable solids. Analysis is applied to axially loaded members, circular shafts, beams and columns. Statically indeterminate systems, properties of structural materials, Stress analysis, principal stresses, Mohr's Circle and combined loading are included. Thin wall cylinder analysis, torsion, beam bending and transfer shear in beam are also covered.

Course 4 code: 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.

Course 5 code: 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).

Course 6 code: CIVE2320:
The students taking this course will demonstrate basic knowledge of the essential structural analysis techniques, understanding of the scope of statistically determinate beams, trusses, frames, structural loading, structural instability deflections by integration method, moment area method and conjugate beam method. The students will also apply the main methodologies of structural design.

Course 7 code: CIVE2210:
The course Introduces students to the basics of engineering geology, such as geological structures, rocks/soil formation, types and their physical characteristics. The study of the soil will be the second part of this course, in which the students will be able to classify the soil and identify their engineering properties. The effects of compaction, permeability, seepage, and soil stresses are also within the scope of this course. This course also includes experimental work related to soil properties.

Course 8 code: CIVE2120:
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.

Course 9 code: 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.

Course 10 code: 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**

Course 1 code: CIVE3340
This course will emphasize developing students' ability to analyze a structure and to provide realistic applications encountered in professional practice. The students taking this course will be introduced to elementary structural analysis techniques, influence lines diagrams, deflections by virtual work method, analysis of indeterminate structures using method of consistent deformations, slope deflection method and moment distribution method, introduction to matrix method and structural analysis software.

Course 2 code: CIVE3360:
This course focuses on steel structures, layout of steel structures, calculation of loads and forces in steel members, steel material properties, steel cross-section properties, design of steel tension members, design of steel compression members, design of laterally unrestrained and restrained steel beams, design of steel base plates, design of steel members subjected to combined axial and flexural loads and design of steel connections. Students use British Standards BS5950 for structural steel design.

Course 3 code: CIVE3110:
Demonstrate a command of the concepts governing the occurrence, distribution, and movement of water and contaminant substances in watershed systems. Understanding new knowledge in meteorological considerations, precipitation, evaporation, transpiration, infiltration, stream flow, hydrograph analysis, flood routing, groundwater flow, and frequency analysis is developed. Understanding the relationship between Principle and mathematical models describing the propagation of contaminants in rivers, lakes, soils, and groundwater.

Course 4 code: 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.

Course 5 code: CIVE3350
Introduce the students to structures and loading systems, reinforced concrete theory for flexure, shear, and compression; strength. Ultimate & serviceability limit states. Code provisions and detailing. Design of beams, solid slabs, Flat slabs, stair slabs, columns and footings. Use STAAD Pro. to design a continuous beam.

Course 6 code: CIVE3220
This course develops fundamental soil mechanics theory and its application to geotechnical analysis and design. Topics covered include stress distribution in soils, compressibility and consolidation of soils, 1D-consolidation theory and characteristics, slope stability, modes of slope failure, and analysis of infinite slope. Students are also introduced to site investigations, bearing capacity and geotechnical design of shallow and deep foundations, a brief introduction about the lateral earth pressure and the calculation of safety factors for retaining walls. This course also includes laboratory investigations to determine the physical and mechanical properties of soil.

Course 7 code: CIVE3410
This course introduces students to the specialized knowledge of transportation and traffic engineering. It demonstrates a command of the concepts for good planning, design, and operation of transport facilities in order to improve their understanding of the relation between safety, efficiency, cost effectiveness and minimize their adverse impacts. This course deals primarily with analytical and extensive understanding of the principles of road transport systems and the traffic analysis process. Topics include specialized problems related to the basic traffic flow theories, traffic management and operations and the travel demand forecasting.

Course 8 code: 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**

Course 1 code: CIVE4510A
In this course, students are required to work in groups to undertake complete design work on a given civil engineering project and to submit some reports to show the project design progress. Briefing seminars regarding good professional practice will be conducted to enhance the students' capabilities and performance

Course 2 code: CIVE4130
This course is oriented to review advanced specialized practices of water resources engineering within civil engineering program including analyses and design elements. There is an extensive understanding of four major topics covered in this course including water resources planning and water demand/supply analysis and design, urban sewage drainage systems design, flood damage mitigation and hydraulic structures design such as dams, culverts and irrigation systems design.

Course 3 code: CIVE4810
The course includes the study of project components, construction contract and tendering, project closeout, planning and scheduling of project by critical path method, least cost scheduling, cost estimation and the role of engineering economics in civil construction

Course 4 code: 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.

Course 5 code: CIVE4420
A study of the advanced specialized concepts required to demonstrate a general understanding for design construction and management of roads with extensive understanding of the principles of highway engineering. In addition, general knowledge of the essential fundamentals of road safety will be addressed. Also, applying established concepts with advanced technologies on the highway planning and management also will be discussed.

Course 6 code: CIVE4140
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.

Course 7 code: CIVE4510B:
In this course, students are required to work in groups to undertake complete design work on a given civil engineering project and to submit some reports to show the project design progress. Briefing seminars regarding good professional practice will be conducted to enhance the students' capabilities and performance.

Course 8 code: 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.

# ELECTRICAL AND COMPUTER ENGINEERING (ECE)

## General Information about the Program:

| | |
|---|---|
| Program Name | **Electrical and Computer Engineering** |
| Award | Bachelor of Engineering<br>Electrical and Computer Engineering |
| Exit point | Diploma |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 4 Academic Years Minimum |
| Credit Units / Hours | 69 Credit Units / 133 Credit Hours |
| Professional Body Accreditation | Full Accreditation by Engineers Australia |
| Entry Requirement | • Completed the General Education Diploma in Oman, or equivalent (formerly Secondary School Completion Certificate), and<br>• Obtained at least a pass mark of 50% or equivalent in Advanced Mathematics, Physics, and/or Chemistry. |

## Program Aim

The Electrical and Computer Engineering program aims to graduate engineers who are capable of working in the field of Electrical and Computer Engineering with high technical, communication, teamwork, and leadership skills.

## Program Objectives (POs)

**PO1:** Engineers who can successfully work in Electrical and Computer Engineering or related disciplines.

**PO2:** Engineers who act ethically and professionally in modern diverse work environments and communities through effective communication, leadership, and responsible teamwork.

**PO3:** Engineers who pursue post-graduate studies and/or professional development in Electrical and Computer Engineering or related disciplines to sustain and advance their careers.

## Program Learning Outcomes (PLOs) for Bachelor Exit Award

| |
|---|
| **PLO1:** Apply advanced knowledge of engineering, science, and mathematics for solving Electrical and Computer Engineering problems. |
| **PLO2:** Design specialized engineering system solutions for complex problems related to Electrical and Computer Engineering. |
| **PLO3:** Communicate effectively on complex engineering activities, with adaptation for appropriate audiences. |
| **PLO4:** Utilize a wide range of numerical skills for solving complex Electrical and Computer Engineering problems. |
| **PLO5**: Use a wide range of information and communication technology tools and techniques in the discipline of Electrical and Computer Engineering. |
| **PLO6:** Practice highly advanced levels of ethical principles and values in the fields of Electrical and Computer Engineering. |
| **PLO7:** Develop advanced leadership and teamworking skills to establish goals and meet objectives with full accountability. |
| **PLO8:** Apply highly specialized entrepreneurial and employability skills suitable for the work environment. |
| **PLO9:** Implement lifelong learning independently for integration of new knowledge using appropriate learning strategies. |

## Program Learning Outcomes (PLOs) for Diploma Exit Award

| |
|---|
| **PLO1:** Apply significant knowledge of engineering, science, and mathematics to solve Electrical and Computer engineering problems. |
| **PLO2:** Prepare solutions for well-defined tasks related to Electrical and Computer Engineering. |
| **PLO3:** Communicate appropriately on engineering activities with diverse audiences. |
| **PLO4:** Utilize a broad range of numerical skills for solving Electrical and Computer Engineering problems. |
| **PLO5:** Use a range of information and communication technology tools and techniques in the discipline of Electrical and Computer Engineering |
| **PLO6:** Practice significant levels of ethical principles and values in the fields of Electrical and Computer Engineering. |
| **PLO7:** Develop leadership and teamwork skills with full accountability for achieving goals and objectives. |
| **PLO8:** Employ substantial entrepreneurial and employability skills in a work environment. |
| **PLO9:** Identify the need for lifelong learning in the context of technological change related to Electrical and Computer Engineering. |

## Study Plan

Curriculum Structure

| Year/ Level | Semester | Course Code | Course Title | Type | Pre-requisites | Credit Unit/ Hour | OQF Level | OQF Credit Hour |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | CHEM1020 | General Chemistry | Compulsory | None | 2/4 | 5 | 4 |
| | | COMP1500 | Introduction to Programming | Compulsory | IC3M2 | 2/4 | 5 | 4 |
| | | ENGG1013 | Engineering Drawing and Computer Drafting | Compulsory | None | 1/2 | 5 | 2 |
| | | MATH1010 | Calculus I | Compulsory | SET3 | 2/4 | 5 | 4 |
| | | UNIR1100 | Communication Skills (1) | Compulsory | None | 2/3 | 5 | 3 |
| | 2 | ELEC1100 | Principles of Electrical Circuits | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1010 | Applied Mechanics | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1023 | Engineering Materials | Compulsory | None | 2/4 | 5 | 4 |
| | | MATH1200 | Calculus II | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | UNIR1001 | Oman and Islamic Culture | Compulsory | IC3M1A | 1/2 | 5 | 2 |
| 2 | 1 | COMP2130 | Digital and Computer Systems | Compulsory | MATH1010 and COMP1500 | 2/4 | 6 | 4 |
| | | ELEC2113 | Instrumentation & Measurement | Compulsory | ELEC1100 | 2/4 | 6 | 4 |
| | | ELEC2200 | Electrical and Electronic Circuit Analysis | Compulsory | ELEC1100 | 2/4 | 6 | 4 |
| | | MATH2200 | Differential Equations and Statistics | Compulsory | MATH1200 | 2/4 | 6 | 4 |
| | | UNIR1002 | Arabic Language Skills | Compulsory | SET 1A | 1/2 | 6 | 2 |
| | 2 | COMP2230 | Data Structures and Algorithms | Compulsory | COMP1500 | 2/4 | 6 | 4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | ELEC2013 | Signals & Systems | Compulsory | MATH2200 | 2/4 | 6 | 4 |
| | | ELEC2300 | Electrical Energy Conversion & Utilization | Compulsory | ELEC1100 | 2/4 | 6 | 4 |
| | | UNIR2001 | Entrepreneurship | Compulsory | None | 2/2 | 6 | 2 |
| | | UNIR2100 | Communication Skills (2) | Compulsory | UNIR1100 | 2/3 | 6 | 3 |
| **Diploma Exit Award** | | | | | | **37/70** | **6** | **70** |
| 3 | 1 | COMP3130 | Computer Networks and Security | Compulsory | COMP2130 | 2/4 | 7 | 4 |
| | | ELEC3000 | Control Systems Engineering | Compulsory | ELEC2013 | 2/4 | 7 | 4 |
| | | ELEC3400 | Electronic Circuits | Compulsory | ELEC2200 | 2/4 | 7 | 4 |
| | | ENGG3700 | Numerical Analysis and Optimization | Compulsory | MATH2200 | 2/4 | 7 | 4 |
| | 2 | COMP3240 | Introduction to Artificial Intelligence | Compulsory | COMP1500 | 2/4 | 7 | 4 |
| | | ELEC3600 | Electromagnetic Fields and Transmission Lines | Compulsory | MATH1200 | 2/4 | 7 | 4 |
| | | ELEC3500 | Power Electronics | Compulsory | ELEC2200 | 2/4 | 7 | 4 |
| | | UNIR3100 | Communication Skills (3) | Compulsory | UNIR2100 | 2/3 | 7 | 3 |
| 4 | 1 | COMP4130 | Computer Organization and Architecture | Compulsory | COMP2130 | 2/4 | 8 | 4 |
| | | COMP4500 | Computer Vision & Image Processing | Compulsory | ELEC2013 and COMP3240 | 2/4 | 8 | 4 |
| | | ELEC4300 | Power Systems Analysis | Compulsory | ELEC2300 | 2/4 | 8 | 4 |
| | | ENGG4801A | Final Year Project (A) | Compulsory | 75% of Level 3 courses | 2/4 | 8 | 4 |
| | 2 | COMP4230 | Embedded System Design and Interfacing | Compulsory | COMP2130 | 2/4 | 8 | 4 |
| | | COMS4200 | Communication Systems | Compulsory | ELEC2013 | 2/4 | 8 | 4 |
| | | ELEC4020 | Renewable & Sustainable Energy | Compulsory | ELEC2300 | 2/4 | 8 | 4 |
| | | ENGG4801B | Final Year Project (B) | Compulsory | ENGG4801A | 2/4 | 8 | 4 |
| **Bachelor Exit Award** | | | | | | **69/133** | **8** | **133** |

## Course Description

| Level 1 |
| --- |
| Course 1 code: CHEM1020<br>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. |
| Course 2 code: COMP1500<br>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. |
| Course 3 code: ENGG1013<br>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. |
| Course 4 code: MATH1010<br>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. |
| Course 5 code: UNIR1100<br>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. |
| Course 6 code: ELEC1100<br>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. |
| Course 7 code: ENGG1010<br>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. |
| Course 8 code: ENGG1023<br>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. |

Course 9 code: 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.

Course 10 code: UNIR1001
يشتمل هذا المقرر على تعريف الثقافة الإسلامية، وأهميتها، ومصادرها وخصائصها، ومقوماتها، والمعالم التي امتازت بها، ودورها في بناء الشخصية المسلمة، وبيان كيفية مواجهة التحديات المعاصرة التي تعصف بالأمة المسلمة، وأساليب الغزو الفكري، كما يستعرض إسلام أهل عمان، وأبرز ملامح الثقافة الإسلامية في المجتمع العماني، ودور العمانيين في بناء الحضارة الإسلامية ونشر الإسلام، وإسهاماتهم في المجالين التجاري والحضاري

**Level 2**

Course 1 code: COMP2130
This course introduces the fundamental principles of digital systems and the basics of computer hardware. Students will learn the operation, electrical characteristics, and timing properties of essential digital building blocks, as well as gain proficiency in a hardware description language for specifying and simulating digital circuits. The course emphasizes both analysis and design of simple digital systems. Through hands-on laboratory sessions, students will implement small-scale systems using standard digital hardware platforms.

Course 2 code: 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.

Course 3 code: ELEC2200
This course introduces the principles of AC circuit analysis and the fundamentals of electronic devices. Topics include single- and three-phase AC circuits, circuit theorems, and power calculations. Students also study semiconductor basics, diodes, BJTs, FETs, and MOSFETs with emphasis on biasing, small-signal analysis, and practical applications in circuit design.

Course 4 code: 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.

Course 5 code: UNIR1002
هذه القضايا تتعلق بأقسام .يتناول هذا المقرر عددا من القضايا النحوية والصرفية والإملائية والبلاغية التي تسهم في إكساب المهارات اللغوية ويعقب هذا القضايا نصوص.الكلام، وأنواع الإعراب، والجملة الاسمية، والجملة الفعلية، ومكملات الجملة، والخبر والإنشاء )الاستماع، والقراءة، والكتابة، والتحدث(تطبيقية مختارة، مع التركيز على تنمية المهارات اللغوية الأساسية

Course 6 code: COMP2230
This course introduces the concept of algorithms and data structures using significant knowledge of different related methodologies. The course will also highlight writing steps for solving well-defined engineering problems using pseudo code and drawing flowchart. Furthermore, this course implements algorithms for element manipulation and sorting and searching techniques. The course will also emphasize on: arrays, Linked lists, sorting, binary search, binary trees, stack, queue, and dequeuer.

Course 7 code: ELEC2013
This course introduces the theory of signals, systems and practice of processing analogue signals to many branches of engineering and mathematics that stem from it. It focuses on one-dimensional signals and single-input, single-output, linear time-invariant systems, time and frequency-domain representation and analysis of continuous and discrete time signals and systems, Fourier Series and Fourier transform, Laplace transform, Z-Transform and their

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| applications in filter design, signal telecommunications and control. MATLAB software will be used to implement signals of modern communication and control systems. |
| Course 8 code: ELEC2300<br>This course covers the principles of electrical energy conversion and its practical applications. Topics include magnetic circuits, transformer operation and performance, DC and induction machines, and various energy conversion systems such as non-renewable, wind, and solar. The course also introduces demand-side management, energy consumption, and professional practices in electrical engineering. |
| Course 9 code: UNIR 2001<br>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. |
| Course 10 code: UNIR2100<br>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** |
| Course 1 code: COMP3130<br>This course provides an in-depth understanding of computer networks and the essential principles of network security. Students will explore the architecture, protocols, and operations of various types of networks, as well as the measures required to secure these networks against potential threats. The course combines theoretical foundations with practical applications to prepare students for real-world challenges in networking and cybersecurity. |
| Course 2 code: ELEC3000<br>This course provides the students with specialized knowledge of control systems, modeling of electrical and mechanical systems, and generating the control system transfer function by using block diagram reduction. Also, the course will demonstrate a command of the open and closed-loop control, transient analysis, steady-state analysis, and root locus concepts. In addition, the course will develop a broad range of cognitive and technical skills to solve problems related to control system engineering. |
| Course 3 code: ELEC3400<br>This course establishes the fundamentals of small signal analysis of BJT and FET amplifiers circuit, frequency response of the amplifiers, constant current sources, differential amplifiers, multistage amplifiers, power amplifiers, operational amplifier and its applications, active filters, and oscillator circuits. |
| Course 4 code: ENGG3700<br>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. |
| Course 5 code: COMP3240<br>The course provides students with a foundational understanding of AI concepts, techniques, and applications. It explores the principles of intelligent systems and how they can be designed to solve complex problems. The course begins with an overview of intelligent agents, their structure, and their decision-making processes. A significant portion is dedicated to search algorithms, including uninformed search methods and informed (heuristic) search techniques that enable efficient problem-solving. Students will also be introduced to various AI techniques |

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| in real-world applications, including Artificial Neural Networks (ANNs), Genetic Algorithms, Fuzzy Logic, and Neuro-Fuzzy Systems, which combine neural networks and fuzzy logic. |
| Course 6 code: ELEC3600<br>This course establishes the fundamentals of distributed transmission media, wave propagation on a transmission line and impedance matching. The course also presents the wave propagation in optical fiber, fiber optics characteristics parameters and basic electromagnetic theory as required by students in electrical, telecommunications, computing and other engineering-based technologies. |
| Course 7 code: ELEC3500<br>This course provides a comprehensive introduction to power electronics and its applications in modern electrical systems. Topics include semiconductor switching devices, rectifiers, DC-DC converters, inverters, and AC voltage controllers. Students study power conversion principles, converter performance, pulse-width modulation, and drive applications for AC and DC motors. |
| Course 8 code: UNIR3100<br>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** |
| Course 1 code: COMP4130<br>This course discusses the component, structure and function of a computer. It exposes students with the architecture and organization of a computer. This subject covers the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit, Logic Gates and Boolean Algebra. Assembly languages are exposed to students for better understanding of the computer structure and component as a whole. |
| Course 2 code: COMP4500<br>This course will introduce students to vision sensors, computer vision systems and digital image processing. It also introduces the areas of artificial intelligence that relate to fundamental issues and techniques of computer vision and image processing. Emphasis will be on physical, mathematical, image-processing, pattern recognition, and feature extraction aspects of vision. The course will have a proper Lab activity to enable students to understand the breadth and depth of the lecturing materials. |
| Course 3 code: ELEC4300<br>This course provides an in-depth study of electric power system analysis and modeling. It covers the representation of major power system components, including transmission lines and synchronous machines. Topics include Y-bus and Z-bus matrix formulation, power flow analysis for two-bus and multi-bus systems, and fault calculations using symmetrical components. The course also addresses unbalanced fault analysis, voltage stability, and transient stability to enhance understanding of system performance under various operating conditions. Additionally, the course applies established concepts and theories to solve a wide range of power system problems using PowerWorld software. |
| Course 4 code: ENGG4801A<br>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. |

Course 5 code: COMP4230
This course introduces students to the principles and practices of developing and designing small-scale embedded systems. It emphasizes both theoretical understanding and practical application through detailed engineering design and prototype development. Working in teams, students will undertake real-world design projects that address global challenges, applying cross-disciplinary approaches to solve diverse engineering problems.

Course 6 code: COMS4200
This course introduces the fundamental theories and principles of analog and digital communication systems. It covers key communication techniques with emphasis on the analysis, design, and performance evaluation of communication systems. The course integrates theoretical foundations with practical applications, equipping students with essential knowledge and skills relevant to careers in telecommunications, networking, and signal processing.

Course 7 code: ELEC4020
The course establishes the fundamentals of energy and sustainable development, renewable and non-renewable energy, energy systems, climate change and energy, life cycle analysis, energy conservation and optimization, sustainability and business, energy storage and management.

Course 8 code: 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.

# MECHANICAL AND MECHATRONIC ENGINEERING (MME)

## General Information about the Program:

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| Program Name | **Mechanical and Mechatronic Engineering** |
| Award | Bachelor of Engineering<br>Mechanical and Mechatronic |
| Exit point | Diploma |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 4 Academic Years Minimum |
| Credit Units / Hours | 69 Credit Units / 133 Credit Hours |
| Professional Body Accreditation | Full Accreditation by Engineers Australia |
| Entry Requirement | • Completed the General Education Diploma in Oman, or equivalent (formerly Secondary School Completion Certificate), and<br>• Obtained at least a pass mark 50% or equivalent) in Advanced Mathematics, Physics, and/or Chemistry. |

## Program Aim

The Mechanical and Mechatronic Engineering program aims to graduate engineers capable of working in Mechanical and Mechatronic engineering with high technical, communication, teamwork, and leadership skills.

## Program Objectives (POs)

**PO1:** Engineers who can successfully work in Mechanical and Mechatronic Engineering or related disciplines.

**PO2:** Engineers who act ethically and professionally in modern diverse work environments and communities through effective communication, leadership, and responsible teamwork.

**PO3:** Engineers who pursue post-graduate studies and/or professional development in Mechanical and Mechatronic Engineering or related disciplines to sustain and advance their careers.

## Program Learning Outcomes for (PLOs) Bachelor Exit Award

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| **PLO1:** Apply advanced knowledge of engineering, science, and mathematics for solving Mechanical and Mechatronic Engineering problems. |
| **PLO2:** Design specialized engineering system solutions for complex problems related to Mechanical and Mechatronic Engineering. |
| **PLO3:** Communicate effectively on complex engineering activities, with adaptation for appropriate audiences. |
| **PLO4:** Utilize a wide range of numerical skills for solving complex Mechanical and Mechatronic Engineering problems. |
| **PLO5:** Use a wide range of information and communication technology tools and techniques in the discipline of Mechanical and Mechatronic Engineering. |
| **PLO6:** Practice highly advanced levels of ethical principles and values in the fields of Mechanical and Mechatronic Engineering. |
| **PLO7:** Develop advanced leadership and teamworking skills to establish goals and meet objectives with full accountability. |
| **PLO8:** Apply highly specialized entrepreneurial and employability skills suitable for work environment. |
| **PLO9:** Implement lifelong learning independently for integration of new knowledge using appropriate learning strategies. |

## Program Learning Outcomes (PLOs) for Diploma Exit Award

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| **PLO1:** Apply significant knowledge of engineering, science, and mathematics for solving Mechanical and Mechatronic Engineering problems. |
| **PLO2:** Prepare solutions for well-defined tasks related to Mechanical and Mechatronic Engineering. |
| **PLO3:** Communicate appropriately on engineering activities, with diverse audiences. |
| **PLO4:** Utilize a broad range of numerical skills for solving Mechanical and Mechatronic Engineering problems. |
| **PLO5:** Use a range of information and communication technology tools and techniques in the discipline of Mechanical and Mechatronic Engineering. |
| **PLO6:** Practice significant levels of ethical principles and values in the fields of Mechanical and Mechatronic Engineering. |
| **PLO7:** Develop leadership and teamwork skills with full accountability for achieving goals and objectives. |
| **PLO8:** Employ substantial entrepreneurial and employability skills in a work environment. |
| **PLO9:** Identify the need for lifelong learning in the context of technological change related to Mechanical and Mechatronic Engineering. |

## Study Plan

**Curriculum Structure**

| Year/ Level | Semester | Course Code | Course Title | Type | Pre-requisites | Credit Unit/ Hour | OQF Level | OQF Credit Hour |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | CHEM1020 | General Chemistry | Compulsory | None | 2/4 | 5 | 4 |
| | | COMP1500 | Introduction to Programming | Compulsory | IC3M2 | 2/4 | 5 | 4 |
| | | ENGG1013 | Engineering Drawing and Computer Drafting | Compulsory | None | 1/2 | 5 | 2 |
| | | MATH1010 | Calculus I | Compulsory | SET3 | 2/4 | 5 | 4 |
| | | UNIR1100 | Communication Skills (1) | Compulsory | None | 2/3 | 5 | 3 |
| | 2 | ELEC1100 | Principles of Electrical Circuits | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1010 | Applied Mechanics | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | ENGG1023 | Engineering Materials | Compulsory | None | 2/4 | 5 | 4 |
| | | MATH1200 | Calculus II | Compulsory | MATH1010 | 2/4 | 5 | 4 |
| | | UNIR1001 | Oman and Islamic Culture | Compulsory | IC3M1A | 1/2 | 5 | 2 |
| 2 | 1 | MECH2118 | Manufacturing Processes | Compulsory | ENGG1023 | 2/4 | 6 | 4 |
| | | ELEC2113 | Instrumentation & Measurement | Compulsory | ELEC1100 | 2/4 | 6 | 4 |
| | | MECH2308 | Strength of Materials | Compulsory | ENGG1010 | 2/4 | 6 | 4 |
| | | MATH2200 | Differential Equations and Statistics | Compulsory | MATH1200 | 2/4 | 6 | 4 |
| | | UNIR1002 | Arabic Language Skills | Compulsory | SET 1A | 1/2 | 6 | 2 |
| | 2 | METR2000 | Fundamentals of Mechatronics | Compulsory | None | 2/4 | 6 | 4 |
| | | MECH2108 | Mechanical Drawing & | Compulsory | ENGG1013 | 2/4 | 6 | 4 |

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| | | | Design Fundamentals | | | | | |
| | | MECH2413 | Fundamentals of Fluid Mechanics | Compulsory | None | 2/4 | 6 | 4 |
| | | UNIR2001 | Entrepreneurship | Compulsory | None | 2/2 | 6 | 2 |
| | | UNIR2100 | Communication Skills (2) | Compulsory | UNIR1100 | 2/3 | 6 | 3 |
| **Diploma Exit Award** | | | | | | **37/70** | **6** | **70** |
| 3 | 1 | METR3200 | Control Systems Engineering | Compulsory | None | 2/4 | 7 | 4 |
| | | MECH3800 | Non-destructive testing & Metrology | Compulsory | None | 2/4 | 7 | 4 |
| | | MECH3408 | Heat Transfer | Compulsory | None | 2/4 | 7 | 4 |
| | | ENGG3700 | Numerical Analysis and Optimization | Compulsory | MATH2200 | 2/4 | 7 | 4 |
| | 2 | METR3013 | Programmable Logic Controllers and Automation | Compulsory | None | 2/4 | 7 | 4 |
| | | MECH3313 | Advanced Machine Design & Finite Elements | Compulsory | None | 2/4 | 7 | 4 |
| | | MECH3508 | Thermodynamics | Compulsory | None | 2/4 | 7 | 4 |
| | | UNIR3100 | Communication Skills (3) | Compulsory | UNIR2100 | 2/3 | 7 | 3 |
| 4 | 1 | MECH4213 | Robot Dynamics and Mechanical Vibrations | Compulsory | None | 2/4 | 8 | 4 |
| | | MECH4913 | Design Project A | Compulsory | None | 2/4 | 8 | 4 |
| | | METR4913 | Computer Vision and Image Processing | Compulsory | None | 2/4 | 8 | 4 |
| | | ENGG4801A | Final Year Project (A) | Compulsory | 75% of Level 3 courses | 2/4 | 8 | 4 |
| | 2 | MECH4513 | Refrigeration & Heat Engines | Compulsory | MECH3508 | 2/4 | 8 | 4 |
| | | MECH4914 | Design Project B | Compulsory | None | 2/4 | 8 | 4 |
| | | MECH4012 | Advanced Manufacturing Technology | Compulsory | MECH2118 | 2/4 | 8 | 4 |
| | | ENGG4801B | Final Year Project (B) | Compulsory | ENGG4801A | 2/4 | 8 | 4 |
| **Bachelor Exit Award** | | | | | | **69/133** | **8** | **133** |

## Course Description

### Level 1

Course 1 code: 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.

Course 2 code: 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.

Course 3 code: 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.

Course 4 code: 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.

Course 5 code: 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.

Course 6 code: 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.

Course 7 code: 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.

Course 8 code: 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.

Course 9 code: MATH1200
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**Level 2**

Course 1 code: MECH2118
This course offers an in-depth understanding of manufacturing processes and material properties. It covers fundamental concepts in metal casting (including sand, die, and precision casting), metal forming (such as forging, rolling, drawing, and extrusion), sheet metal work, heat treatment, welding, brazing, and soldering. Students will develop technical skills in metal cutting operations, including turning, shaping, planning, drilling, milling, and grinding. Additionally, the course emphasizes the importance of Professional Practices and Ethics essential for building a successful career in the field.

Course 2 code: 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.

Course 3 code: MECH2308
This course describes the relationship between stress and strain in deformable solids. Analysis is applied to axially loaded members, circular shafts, beams and columns. Statically indeterminate systems, properties of structural materials, Stress analysis, principal stresses, Mohr's Circle and combined loading are included. Thin wall cylinder analysis, torsion, beam bending and transfer shear in beam are also covered.

Course 4 code: 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.

Course 5 code: 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).

Course 6 code: METR2000
The "Fundamentals of Mechatronics" course introduces the principles and applications of mechatronic systems, integrating mechanical, electronic, and computational elements. Topics include hydraulic and pneumatic systems, sensors, actuators, and motors such as stepper, DC, and servo motors. The course explores CNC machines, basic programming for turning and milling operations, and microcontrollers for system interfacing. It covers control and communication systems, signal conversion (ADC/DAC), and the role of artificial intelligence and robotics in automation. Through theoretical knowledge and practical activities, students will develop essential skills for analyzing, designing, and implementing mechatronic systems in real-world applications.

Course 7 code: MECH2108
This course provides principles of technical and assembly drawings of various mechanical components and elementary design concepts. The first part covers mechanical drawing and the second deals with the basic design aspects of mechanical components and assemblies. Topics included are part and assembly drawings of various mechanical components and basic design concepts of various mechanical components such as thread fasteners, power screws, flexible drives, springs, couplings, gears and bearings.

Course 8 code: MECH2413
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.

Course 9 code: 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.

Course 10 code: 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**

Course 1 code: METR3200
This course provides the students with specialized knowledge of control systems, modeling of electrical and mechanical systems, and generating the control system transfer function by using block diagram reduction. Also, the course will demonstrate a command of the open and closed-loop control, transient analysis, steady-state analysis, and root locus concepts. In addition, the course will develop a broad range of cognitive and technical skills to solve problems related to control system engineering.

Course 2 code: MECH3800
The course provides knowledge of specialized inspection techniques in non-destructive testing (NDT) such as Eddy current (ECT), Magnetic particle (MPT), Penetrant (PT), X-ray radiography (RT), Ultrasonic (UT) flaw detection etc. The course also focusses on statistical quality control methods applied to industries, linear, angular and mechanical measurement (Metrology) techniques. The students' professional advancement in the industries would be aided by this course.

Course 3 code: MECH3408
The course aims to provide the student with the background necessary to understand fundamentals of heat transfer and its applications so that they are able to solve heat transfer calculations and design equipment for industrial applications.

Course 4 code: 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.

Course 5 code: METR3013
This course introduces the fundamentals of industrial automation and the role of programmable logic controllers in the control of industrial processes.

Course 6 code: MECH3313
The course deals with specialized knowledge of design of mechanical elements, prediction of mechanical response and failure mechanism of machine components and structures. Computer modelling of stresses using the Finite Element Analysis (FEA) and assessment of criteria to analyze stresses and predict failure. The lectures on the FEM will introduce the mathematical theory and focus on issues in modelling and on the interpretation of results and findings. The lectures on mechanical design will consider the design of mechanical elements and issues such as concepts of stress concentration, and application of fracture mechanics to evaluate components failures resulting from static and variable- fatigue loading.

Course 7 code: MECH3508
This course introduces scientific concepts pertaining to the conversion of energy between various forms such as heat, work, and internal energy. Based on the four basic thermodynamic laws (zeroth, first, second, and third), the physical science of heat and temperature, as well as their relationships to energy, entropy and work, are analyzed. These thermodynamic principles are applied to various real-world systems such as gas and vapor power thermal systems.

Course 8 code: 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**

Course 1 code: MECH4213
This course is divided into two key sections. The first part offers comprehensive coverage of specialized robotics topics, including industrial automation, introduction to robotics, robot sensors, vision systems, end effectors, drives, actuators, robot kinematics and dynamics, and coordinate transformation. The second part focuses on advanced mechanical vibrations, covering free and forced vibrations, damped and undamped systems, vibration isolation, and multi-degree-of-freedom vibration systems.

Course 2 code: MECH4913
This course aims to prepare students to design mechanical and or mechatronic systems. The mechanical or mechatronic system comprises individual elements that must work together synergistically. It must reliably and economically do specified functions. Engineers at this level of the program must use their acquired technical knowledge, learning ability, and conceptual skills to assess the requirements, select or invent components, and combine and size them to satisfy the intended function. The management would receive the final product from the designer and deliver it to the market or the customer accurately and convincingly.

Course 3 code: METR4913
This course will introduce students to vision sensors, computer vision systems and digital image processing. It also introduces the areas of artificial intelligence that relate to fundamental issues and techniques of computer vision and image processing. Emphasis will be on physical, mathematical, image-processing, pattern recognition, and feature extraction aspects of vision. The course will have a proper Lab activity to enable students understand
the breadth and depth of the lecturing materials.

Course 4 code: 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.

Course 5 code: MECH4513
This course develops an advanced knowledge of heat engines, refrigeration systems and air conditioning applications. The course mainly focuses on thermodynamic cycles, performance analysis of Internal and external combustion engines, refrigeration and air-conditioning applications including aircraft refrigeration systems, vapor compression and absorption refrigeration systems, cascade refrigeration systems etc. The course also gives special thrust to psychometrics, various air-conditioning processes, cooling and heating load calculations for designing an air conditioning system.

Course 6 code: MECH4914
Design Project B is a capstone design course that focuses on various project management tools and detailed design of a mechanical/ Mechatronic/thermal system. The students will apply their knowledge and skills to design a mechanical or mechatronic system and to determine the economic, environmental, and ethical aspects of the proposed design. They will work in teams, prepare written and technical reports.

Course 7 code: MECH4012
This course provides an in-depth exploration of modern manufacturing technologies, blending traditional principles with cutting-edge advancements to prepare students for the evolving landscape of industrial engineering. Emphasizing the integration of automation, digital technologies, and precision machining, the course covers topics such as Computer-Integrated Manufacturing (CIM), Industry 4.0, and smart manufacturing systems. Students will gain comprehensive knowledge of cutting tool technologies, mechanics of single-point and multi-point cutting tools, and advanced CNC machining techniques, including shop turn and shop mill programming. The course also delves into rapid prototyping technologies, fundamentals of additive manufacturing, and assembly line optimization. In addition, students will explore non-

traditional machining methods, including thermal, electrochemical, and mechanical energy-based processes, equipping them with skills to address complex manufacturing challenges. With a focus on research, problem-solving, and practical applications, this course bridges the gap between theory and industry practice, preparing students to innovate and excel in the field of advanced manufacturing.

Course 8 code: 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.

# MASTER OF ENGINEERING IN ENVIRONMENTAL ENGINEERING

## General Information about the Program:

| | |
|---|---|
| Program Name | **Environmental Engineering** |
| Award | Master of Engineering in Environmental Engineering |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 2 Academic Years Minimum |
| Credit Units/Hours | 24 Credits Units / 36 Credit Hours |
| Entry Requirement | • Hold a Bachelor degree (or equivalent) in an Engineering field (Civil Engineering, Process Metallurgy and Materials Engineering, Chemical Engineering, or other close Engineering specialty from Sohar University or another reputable university with:<br>• CGPA of at least 2.4 out of 4.00 for new graduates or 2.25 out of 4.00 for candidates with 2 or more years of relevant professional experience.<br>• Satisfy the English proficiency requirements: an IELTS score of 6+, or TOFEL score of 500 or above in paper-based exam or score of 173 or above in the computer-based exam or 61 in internet-based exam (not more than 2 years old).<br>• Candidates who did not satisfy English language requirements must enroll in a Specialized Professional English Course, for which a fee will be charged, run by the University. Passing is essential for degree award.<br>• Candidates who graduated from a programme delivered in English language will be exempted from the language requirements provided that they pass an interview with the Admission Committee at FE.<br>• Pass marks in an interview with the Admission Committee at FE.<br>• Admission to M Eng. program is subject to the ratifications of the MoHERI, Sultanate of Oman. |

## Program Aim

The Master of Engineering in Environmental Engineering program aims to equip graduates with the skills necessary to design and implement technology and management practices that effectively utilize resources and assets sustainably and cost-effectively. It focuses on using scientific and engineering processes and tools to solve problems related to air, water, and soil quality.

## Program Objectives (POs)

**PO1:** Graduates will have a mastery of the basics and relevant advanced knowledge and tools in core fields of Environmental Engineering and the ability to solve complex problems in and across sub-disciplines of Environmental Engineering.

**PO2:** Graduates will play a crucial role in societal development, utilizing their ability to develop sustainably and applying environmental engineering principles in their professional careers.

**PO3:** Graduates will exemplify a commitment to lifelong learning, actively pursuing professional development and growth in the environmental engineering discipline.

## General Information about the Program:

**PO4:** Graduates will contribute to the environmental, social, economic, and technological pillars of the knowledge-based economy through the production of innovative solutions that are supportive of sustainable development and evidence-based decision-making.

## Program Learning Outcomes (PLOs)

| | |
|---|---|
| **PLO1:** | Apply knowledge of physical, chemical, and biological sciences and mathematics appropriate to the field of environmental engineering to tackle more complex, open-ended problems. |
| **PLO2:** | Apply understanding of material and energy balances to examine the movement of chemicals in air, water and soils related to environmental problems of societal importance. |
| **PLO3:** | Use complex lab results, work with experimental data and communicate experimental information through appropriate methods for use in design and practice. |
| **PLO4:** | Use engineering concepts and numerical methods towards the design of environmentally friendly systems, components, or processes that consider risk, uncertainty, life cycle principles, and environmental impact. |
| **PLO5:** | Incorporate advanced knowledge and environmental related practices of information and communication technologies in appropriate ways for professional work purposes. |
| **PLO6:** | Assume responsibility for the translation of tools and practices of the profession, project management and institutional roles to the conduct of environmental policy and regulations. |
| **PLO7:** | Apply knowledge related to the global, societal, and environmental implications of environmental engineering solutions based on knowledge of current issues. |
| **PLO8:** | Use effective and professional communication methods to collaborate within multi-disciplinary teams. |

## Study Plan

| Curriculum Structure | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Year/ Level** | **Semester** | **Course Code** | **Course Title** | **Type** | **Pre-requisites** | **Credit Unit/ Hour** | **OQF Level** | **OQF Credit Hour** |
| 1 | 1 | ENVE6001 | Geo-environmental Engineering | Compulsory | None | 2/3 | 9 | 3 |
| | | ENVE6002 | Air Pollution Control Design | Compulsory | None | 2/3 | 9 | 3 |
| | | ENVE6005 | Environmental Risk Assessment | Elective | None | 2/3 | 9 | 3 |
| | | UNIR6000 | Advanced Communication for Engineers | Compulsory | None | 0/0 | 9 | 0 |
| | 2 | ENVE6003 | Solid Waste Technology and Management | Compulsory | None | 2/3 | 9 | 3 |
| | | ENVE6004 | Advanced Water and Wastewater Treatment | Compulsory | None | 2/3 | 9 | 3 |
| | | ENVE6013 | Microbiology in Environmental Engineering | Elective | None | 2/3 | 9 | 3 |
| 2 | 1 | ENVE6000A | Master's Thesis | Compulsory | Compulsory | 6/9 | 9 | 9 |
| | 2 | ENVE6000B | Master's Thesis | Compulsory | Compulsory | 6/9 | 9 | 9 |
| **Masters Exit Award** | | | | | | **24/36** | **9** | **36** |

## Course Description

### Level 1

Course 1 code: ENVE6001
Geoenvironmental engineering deals with the behavior of soils, rocks and groundwater when they interact with contaminants and addresses problems of hazardous and non-hazardous waste management, contaminated sites, and sustainable development. The topics include various geoenvironmental problems and the need for environmental engineering, the fundamental background needed to understand and address environmental problems, management of wastes through engineered landfills and impoundments, characterizing, assessing and remediating contaminated sites, beneficial use of waste and recycled materials, and incorporating sustainability in waste management and pollution control.

Course 2 code: ENVE6002
This course focuses on core principles and advanced specialized knowledge of air pollution, physical and chemical principles regarding formation and control of air pollutants in industrial and technological processes, air pollution modeling principles of particulate and gaseous control; design devices and systems for air pollution control and application to industrial air pollution control.

Course 3 code: ENVE6003
The course aims to provide a comprehensive understanding of the problems associated with solid waste and the various technologies and management strategies used to address them. It focuses on developing specific skills related to waste management planning, source separation, incineration, and landfilling. Additionally, the course emphasizes the principles and tools necessary for conducting assessment of solid waste management systems.

Course 4 code: ENVE6004
This course covers water quality, standards and regulations, specialized and advanced unit processes of softening, ion exchange, adsorption, solid-liquid filtration and membrane systems. The principle of operation of aerobic treatment processes is discussed in detail and methods of advanced effluent treatment for higher discharge standards and effluent re-use are described. Design of waste water treatment systems is discussed in detail

Course 5 code: ENVE6007
This course covers general procedures, methods, theories and techniques related to monitoring programs for different environments the course provides basic environment assessment procedures. The course is divided into two parts. The first part deals with basic environment monitoring methodology and techniques, which are how to obtain and analyze information on the existence and concentration of substances in the environment, either naturally occurring or from anthropogenic sources. The course also examines natural hazard monitoring. The second part of the course introduces the concept and nature of environmental assessment (EA or EIA), an exploration of best practice in EA and a description of EA procedures.

Course 6 code: ENVE6013
This course covers important aspects of environmental microbiology and its applications to environmental systems. The main topics comprised the role of microorganisms in wastewater treatment, aerobic and anaerobic digestion of municipal sludges, and degradation of water quality in drinking water systems; disinfection of wastewater and drinking water for removal of viruses, bacteria and protozoa that cause waterborne diseases. The course also covers microbiological safety of biosolids, national and international regulations regarding use of biosolids and options for recycling to agricultural and other uses.

Course 7 code: UNIR 6000
This course focuses on training the students on writing and giving oral presentation to different type of audiences they will communicate in their profession.

Course 7 code: ENVE6000
This Master's thesis focuses on addressing an environmental engineering challenge to address the specific problem or research gap. The study employs a systematic methodology or approach to evaluate key variables or focus areas and proposes potential solutions, models, or insights. The findings of this research are expected to contribute to [impact, such as sustainable development, pollution mitigation, resource optimization, or policy improvement and provide a foundation for future advancements.

# DOCTOR OF PHILOSPHY IN ENGINEERING

## General Information about the Program

| | |
|---|---|
| Program Name | **PhD in Engineering** |
| Award | Doctor of Philosophy (PhD) in Engineering |
| Language of Instruction | English |
| Mode of Study | Conventional |
| Study Scheme | Full Time |
| Study Duration | 3 Academic Years Minimum |
| Credit Units/Hours | 48 Credits Units / 90 Credit Hours |
| Entry Requirement | • Hold a Master degree in an Engineering field (Mechanical, Electrical, Chemical, Civil, etc.).<br>• Satisfy the English proficiency requirements: an IELTS score of 6+, or TOFEL score of 500 or above in paper-based exam or score of 173 or above in the computer-based exam or 61 in internet-based exam (not more than 2 years old).<br>• Successfully passed the Ph.D qualifying examination scheduled within the first semester of enrolment.<br>• Admission will be dependent on an assessment of the research topic proposed by the student, to ensure that Sohar University is able to provide appropriate supervision and facilities to support that research. Assessment will be the responsibility of the Ph.D. Program Coordinator and it will be carried out in discussion with the student, Research Degree Committee and the faculty management team to support that research prior to approval of the topic.<br>• Admission to the PhD program is subject to the ratifications of the Ministry of Higher Education, Research, and Innovation (MoHERI), Sultanate of Oman.<br>• Passed an interview with the admission committee (if required). |

## Program Aim

The PhD program in the Faculty of Engineering at Sohar University aims to prepare researchers who can explore complex engineering problems and contribute meaningful solutions through original research. The program encourages independent thinking, strong analytical skills, and in-depth knowledge in the chosen field. It supports students in developing the ability to carry out high-quality research that can benefit industry, society, and the wider academic community. Graduates will be well-equipped to take on advanced roles in universities, research centers, and professional engineering environments.

## Program Objectives (POs)

**PO1:** Researchers who are highly qualified and able to synthesize scientific and technical engineering knowledge to address complex research challenges and generate impactful contributions within the field of Engineering.

**PO2:** Highly skilled graduates who are abreast of the latest advances in their relevant engineering fields that contribute to the advancement of knowledge for the benefit of society.

**PO3:** Scholars who communicate effectively, uphold ethical and responsible practices, and demonstrate leadership and teamwork skills in diverse organizations.

## Program Learning Outcomes (PLOs)

| | |
|---|---|
| **PLO1:** | Apply deep and comprehensive knowledge of engineering, science, and mathematics for solving various dimensions of problems in their relevant fields or professional areas. |
| **PLO2:** | Apply advanced research techniques to emerging development for solving problems by integrating disciplinary knowledge in innovative ways. |
| **PLO3:** | Communicate the results of the original research significantly using a range of media, to the peers and community. |
| **PLO4:** | Analyze complex problems using advanced numerical and computational techniques, leading to the generation of new knowledge and significant developments in their field of specialization. |
| **PLO5:** | Perform lifelong learning and personal development in shaping future directions within the related field. |
| **PLO6:** | Comply with ethics and professionalism, for research advancement in the field and their impact to society. |

## Study Plan

| Curriculum Structure | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Year/ Level** | **Semester** | **Course Code** | **Course Title** | **Type** | **Pre-requisites** | **Credit Unit/ Hour** | **OQF Level** | **OQF Credit Hour** |
| 1 | 1 | PHDE7001 | Research Methodology | Compulsory | None | 0/0 | 10 | 0 |
| 1-3 | 1 and 2 | PHDE7000 | PhD Thesis | Compulsory | None | 48/90 | 10 | 90 |
| **PhD Exit Award** | | | | | | **48/90** | **10** | **90** |

## Course Description

### Level 1

Course 1 code: PHDE7000

The PhD Thesis is a major course of the PhD program, carried out over three years with continuous supervision. Students engage in original research, progressing through stages like literature review, methodology development, data collection, analysis, and thesis writing. Each semester, they are expected to show measurable progress. The course concludes with the submission and defense of a comprehensive thesis that contributes new knowledge to their field.

Course 2 code: PHDE7001

This course introduces students to the fundamentals of academic research, covering topic selection, literature review, research design, data collection, and analysis. It explores both quantitative and qualitative methods, emphasizes ethical research practices, and helps students develop writing and referencing skills. Students will also engage in discussions and activities that strengthen critical thinking. By the end, they will be prepared to draft a research proposal with clarity and confidence.