UOW COLLEGE AUSTRALIA

PATHWAYS TO UNIVERSITY OF WOLLONGONG

# Diploma of Engineering

Course Code: 3255 Diploma of Engineering Standard Session (Domestic)

Year of issue: 2025

# Course Outline

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# Diploma of Engineering Course Outline

## 1 Course Description

The UOW College Australia (UOWCA) Diploma of Engineering provides students with access to the university experience within a supported context. In the introductory phase of this course, students will complete subjects specifically designed to develop effective approaches to learning in the higher education context, with a particular focus on developing foundational mathematical skills essential to engineering. The second phase provides a program of study involving students in first year core engineering subjects, but with additional levels of support which enhance their opportunity to succeed. The Diploma of Engineering provides students with a pathway for entry into the second year of the Bachelor of Engineering (Honours) degree at the University of Wollongong (UOW), with specified credit of up to 48 credit points for subjects in the compulsory core components of this degree.

Diploma qualifications are located at level 5 of the Australian Qualifications Framework. The purpose of the Diploma qualification type is to qualify individuals who apply integrated technical and theoretical concepts in a broad range of contexts to undertake advanced skilled or paraprofessional work and as a pathway for further learning.

# 2 Graduate Qualities

The Diploma of Engineering course is designed to assist students in developing the UOW College Graduate Qualities. It helps students become:

1. **Informed:** Have a basic knowledge of an area of study and understand its issues. Know how to apply this knowledge.
2. **Independent Learners:** Begin to engage with new ideas and ways of thinking and critically analyse issues. Seek to extend knowledge through ongoing enquiry and active learning. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.
3. **Problem Solvers:** Demonstrate introductory levels of creative, logical and critical thinking skills to respond effectively to problems. Be flexible and thorough.
4. **Effective Communicators:** Articulate and convey ideas effectively using a range of media. Work collaboratively and engage with people in different settings.
5. **Responsible:** Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity and act with integrity. Take responsibility for one's own learning and completion of assessment tasks.

# 3 Course Learning Outcomes

Graduates will be able to:

1. Demonstrate language and literacy skills in order to read, write, present and listen effectively at a tertiary level.
2. Demonstrate the ability to locate, evaluate and use information appropriately at a tertiary level.
3. Demonstrate the ability to utilise computer technology in order to function effectively in a university environment.
4. Demonstrate numeracy skills in order to interpret, understand and analyse information at a tertiary level.
5. Apply a range of skills that demonstrate independent learning.
6. Demonstrate fundamental knowledge relevant to the field of engineering.
7. Demonstrate an understanding of ethical behaviour in the engineering environment.
8. Develop simple solutions to a broad range of engineering problems, both theoretical and practical.
9. Operate effectively as a member of a team in a study environment or a simulated workplace environment.

# 4 Course Learning Outcomes Mapped to Graduate Qualities

The table below shows how the graduate qualities are integrated into the course learning outcomes:

| Course Learning Outcomes/Graduate Qualities | 1. Informed | 2. Independent Learners | 3. Problem Solvers | 4. Effective Communicators | 5. Responsible |
|---|---|---|---|---|---|
| 1. Demonstrate language and literacy skills in order to read, write, present and listen effectively at a tertiary level. | | ✓ | | ✓ | ✓ |
| 2. Demonstrate the ability to locate, evaluate and use information appropriately at a tertiary level. | | ✓ | | ✓ | ✓ |
| 3. Demonstrate the ability to utilise computer technology in order to function effectively in a university environment. | | ✓ | | ✓ | ✓ |
| 4. Demonstrate a coherent core understanding of basic mathematical principles and techniques. | ✓ | | ✓ | | |
| 5. Apply a range of skills that demonstrate independent learning. | | ✓ | | | ✓ |
| 6. Demonstrate fundamental knowledge relevant to the field of engineering. | ✓ | | | | |
| 7. Demonstrate an understanding of ethical behaviour in the engineering environment. | ✓ | | | | ✓ |
| 8. Develop simple solutions to a broad range of engineering problems, both theoretical and practical. | ✓ | | ✓ | | |
| 9. Operate effectively as a member of a team in a study environment or a simulated workplace environment. | | | | ✓ | ✓ |

# 5 Course Structure and Subjects

| 3255 DIPLOMA OF ENGINEERING | | | |
|---|---|---|---|
| **SESSION 1: UOW College Session dates only** | | | |
| **Subject Code** | **Subject Name *(UOW Equivalent Subject Code)*** | **Credit Points** | **Contact Hours a Week** |
| PREP030* | Launch | 2 | 2# |
| PREP031* | Language for Learning | 6 | 4 |
| PREP032* | Scientific Thinking | 6 | 4 |
| DPEN010* | Enabling Mathematics *(MATH140)* | 6 | 8 |
| **Total Session 1** | | **20** | **18** |
| **SESSION 2: UOW Autumn Session** | | | |
| **Subject Code** | **Subject Name *(UOW Equivalent Subject Code)*** | **Credit Points** | **Contact Hours a Week** |
| DPEN102 | Fundamentals of Engineering Mechanics *(ENGG102)* | 6 | 6 |
| DPEN105 | Engineering Design for Sustainability *(ENGG105)* | 6 | 6 |
| DPEN103 | Materials in Design *(ENGG103)* | 6 | 6 |
| **Session Total** | | **18** | **18** |
| **SESSION 3: UOW Spring Session** | | | |
| **Subject Code** | **Subject Name *(UOW Equivalent Subject Code)*** | **Credit Points** | **Contact Hours a Week** |
| DPEN100 | Engineering Computing and Analysis *(ENGG100)* | 6 | 6 |
| DPEN104 | Electrical Systems *(ENGG104)* | 6 | 6 |
| DPEN141* | Foundations of Engineering Mathematics *(MATH141)* | 6 | 6 |
| DPEN143* | Physics for Engineers *(PHYS143)* | 6 | 6 |
| **Session Total** | | **24** | **24** |

* Progression Guidelines apply to these subjects – refer to Section 7

#Weekly contact hours calculated for PREP030 Launch are based on a sessional average.

Optional Elective

DPEN001 Principles of Physics for Engineers is recommended for students who have not previously studied Physics, however, it is not a required subject. Students who elect to study this additional subject are not required to pass this subject in order to progress to the next session of the Diploma course or to their degree offer, and this subject carries no credit transfer into UOW degree courses.

Expected Course Workload

As a guide, the workload for your course is determined by the number of subjects you take each session. Attempting four subjects in a standard session is considered to be a fulltime load i.e. equivalent to working fulltime (40hrs a week).

Each subject in this course has designated contact hours where you are required to attend classes including lectures, tutorials, workshops or other structured learning experiences.

To be successful in this course you are also required to undertake independent learning activities outside of your scheduled classes, this includes:

- Preparing for classes: homework, readings and reviewing learning materials.
- Independently researching and/or practicing knowledge and skills.
- Completing all assessment tasks and studying for examinations.
- Attending learning support services.

# 6 Subjects Mapped to Course Learning Outcomes

| Subject/Course Learning Outcomes | 1. Demonstrate language and literacy skills in order to read, write, present and listen effectively at a tertiary level. | 2. Demonstrate the ability to locate, evaluate and use information appropriately at a tertiary level. | 3. Demonstrate the ability to utilise computer technology in order to function effectively in a university environment. | 4. Demonstrate numeracy skills in order to interpret, understand and analyse information at a tertiary level. | 5. Apply a range of skills that demonstrate independent learning. | 6. Demonstrate fundamental knowledge relevant to the field of engineering. | 7. Demonstrate an understanding of ethical behaviour in the engineering environment. | 8. Develop simple solutions to a broad range of engineering problems, both theoretical and practical. | 9. Operate effectively as a member of a team in a study environment or a simulated workplace environment. |
|---|---|---|---|---|---|---|---|---|---|
| DPEN010 Enabling Mathematics | | | | | ✓ | | | | |
| DPEN100 Engineering Computing and Analysis | | | | | | ✓ | | ✓ | |
| DPEN102 Fundamentals of Engineering Mechanics | | | | | | ✓ | | ✓ | |
| DPEN103 Materials in Design | | | | | | | ✓ | ✓ | |
| DPEN104 Electrical Systems | | | | | | ✓ | | ✓ | |
| DPEN105 Engineering Design for Sustainability | | | | | | ✓ | ✓ | ✓ | ✓ |

| Subject/Course Learning Outcomes | 1. Demonstrate language and literacy skills in order to read, write, present and listen effectively at a tertiary level. | 2. Demonstrate the ability to locate, evaluate and use information appropriately at a tertiary level. | 3. Demonstrate the ability to utilise computer technology in order to function effectively in a university environment. | 4. Demonstrate numeracy skills in order to interpret, understand and analyse information at a tertiary level. | 5. Apply a range of skills that demonstrate independent learning. | 6. Demonstrate fundamental knowledge relevant to the field of engineering. | 7. Demonstrate an understanding of ethical behaviour in the engineering environment. | 8. Develop simple solutions to a broad range of engineering problems, both theoretical and practical. | 9. Operate effectively as a member of a team in a study environment or a simulated workplace environment. |
|---|---|---|---|---|---|---|---|---|---|
| DPEN141 Foundations of Engineering Mathematics | ✓ | | | ✓ | | ✓ | | ✓ | |
| DPEN143 Physics for Engineers | | | | | | ✓ | ✓ | ✓ | |
| PREP030 Launch | | | ✓ | | ✓ | | | | |
| PREP031 Language for Learning | ✓ | ✓ | ✓ | | ✓ | | | | |
| PREP032 Scientific Thinking | ✓ | ✓ | ✓ | | ✓ | | | | |

# 7 Progression Guidelines

## Subject Progression

- Students who have not met the Mathematic entry requirements to this course, and who complete bridging subject BRDG001 Bridging for Advanced Mathematics, must achieve a minimum final subject mark of 80% in BRDG001 to enrol in DPEN010.
- DPEN010 Enabling Mathematics is a pre-requisite for DPEN141 Foundations of Engineering Mathematics. Students cannot enrol in DPEN141 unless they achieve a Pass (P) or Pass - Supplementary (PS) Grade in DPEN010.
- Progression from Session 1 to Session 2 requires a Satisfactory Grade for PREP030 Launch and a minimum final subject result of 50% (a Pass Grade) for each of PREP031 Language for Learning, PREP032 Scientific Thinking and DPEN010 Enabling Mathematics.
    i. Students who achieve a Satisfactory Grade for PREP030 and a Pass Grade for PREP031 may enrol in up to two Session 2 subjects, while repeating PREP032 and/or DPEN010 if they fail one or both of those subjects.
    ii. Students who do not achieve a Satisfactory Grade for PREP030 and a Pass Grade for PREP031 will enrol in subjects in their next session as approved by the Academic Program Manager.
    iii. DPEN010 is a pre-requisite for DPEN141, which may run in Session 2 or Session 3 depending on the Intake Session. Students who do not achieve a Pass Grade for DPEN010 must repeat and pass it before they can take DPEN141.

## Progression to UOW Courses

1. To qualify for the award of the Diploma of Engineering students must achieve a Pass (P) or Pass – Supplementary (PS) Grade for each subject in the Diploma, or in the case of PREP030 Launch, a grade of Satisfactory. This does not apply to optional electives where no minimum result is required.
2. Students who meet the requirements for the award of the Diploma can progress to the second year of the Bachelor of Engineering (Honours) in the Faculty of Engineering and Information Sciences with 48 points of UOW credit transfer.

    No UOW credit transfer is available for: DPEN001 Principles of Physics for Engineers; PREP030 Launch; PREP031 Language for Learning; and PREP032 Scientific Thinking.
3. Students may exit the Diploma course early and enter the Bachelor of Engineering (Honours) with 36 or 42 points of UOW credit transfer ('Early Exit – Incomplete Award'), if they have achieved the following conditions:
    i. Students must have achieved a minimum final mark of 50% in at least 6 credit-bearing subjects (all subject except those listed at 6, above) in the Diploma; and,

ii. Students must be on Active Status to exit the Diploma. Students who are not on Active status must successfully complete the Diploma in full to progress to UOW.

Please refer to the Credit transfer arrangements page for more detailed information:

https://www.uowcollege.edu.au/courses-pathways/admissions-information/credit-transfer-arrangements/

Note: Where a student has opted for Early Exit – Incomplete Award, they will not be eligible for the Diploma award until they successfully complete the outstanding equivalent subjects in their UOW degree. Once a student has completed the equivalent subjects at UOW, the student can submit an Application for Credit for Prior Learning directly to UOW College for the Diploma qualification to be awarded.

# 8 Entry Requirements / Admissions Guidelines

Entry requirements for this course can be viewed online at:

https://coursefinder.uow.edu.au/information/index.html?course=diploma-engineering-domestic-uow-college

# 9 Assessment

Students are required to complete a number and variety of assessment tasks related to their streams of study.

Each subject has a subject outline that is issued to students. Subject outlines contain an overview of subject objectives, an assessment schedule, a list of learning resources and a weekly topic outline. Subject outlines also contain an explanation of assessment components.

All assessment tasks with a weighting of 10% or greater have marking criteria and an answer/marking guide.

All aspects of assessment are governed by Policy, Procedures and Guidelines, which can be viewed at: https://www.uowcollege.edu.au/support-resources/policies-procedures/

# 10 Quality Assurance

The College applies formal quality assurance processes to its design of courses, subjects and their assessments. These processes include:

- Clear subject outlines that align with the objectives of the course and support consistent delivery of content;
- Mandatory inclusion of clear and appropriate marking criteria in assessment tasks;
- Moderation of marking of student assessment tasks, ensuring that the assessment criteria have been applied consistently and there is equity across individual markers;
- A regular schedule of audits on student assessment tasks using randomly-selected samples of student work; and,
- The use of feedback from students and teachers to inform continuous improvement of curriculum, delivery, policies and procedures.

# 11 Subject Descriptions

### DPEN010 Enabling Mathematics

This subject covers the main topics taught in mathematics years 11 and 12 in Australian schools. The chosen topics are specifically those taken as assumed knowledge in the subjects MATH141 and MATH187. The general topic areas are: algebra, trigonometry, coordinate geometry, functions and calculus. The focus is on developing mathematical skills and improving competence and confidence in the language and terms of mathematics. Where possible the work will be related to potential engineering applications.

### DPEN100 Engineering Computing and Analysis

This subject teaches algorithm design and computer programming using MATLAB. Students will develop a systematic approach to analyse engineering problems and create algorithms that solve real-world problems. Topics will include: problem-solving techniques; algorithm design; data types and operators; conditional and repetitive control flow; file access; functions; data visualisation; code optimisation; arrays/matrices; and vectorisation. Students will also focus on computational tools to solve engineering problems such as kinematics of rectilinear and curvilinear motion.

### DPEN102 Fundamentals of Engineering Mechanics

In this subject, students explore fundamental laws of motion and their application to the analysis and design of simple structures. Students will undertake a series of design and build projects to see the effects of concepts of mechanics in real structures. Working in design teams, students will also explore the professional responsibilities of engineers in terms of accountability, liability and sound design and analysis techniques

### DPEN103 Materials in Design

In this subject, students explore the interrelationships between materials structure, properties, processing, application and lifecycle. Students will apply materials science and lifecycle analysis to develop solutions to engineering problem that are optimised for sustainability. Students must consider both economic and environmental impact in the identification and selection of appropriate materials in engineering design

### DPEN104 Electrical Systems

This subject provides an introduction to real-world electrical systems. The subject teaches fundamental electrical concepts: change, current, voltage, resistance, capacitance, inductance, energy and power. The subject introduces theorems to simplify AC and DC circuits through analysis and simulation. The subject also links the fundamental concepts to practical engineering applications such as motors and generators. The laboratory component covers measurements using electrical components and equipment, designing basic circuits, as well as report writing.

### DPEN105 Engineering Design for Sustainability

In this subject, students draw together engineering principles covered in other subjects to develop context-appropriate solutions to engineering challenges. Students will work in teams undertaking investigation, concept development, and detailed design that demonstrate innovative and creative thinking. Students must consider the technical, social, economic and environmental aspects of a design problem to produce solutions that are likely to be workable in the real world.

### DPEN141 Foundations of Engineering Mathematics

This subject consists of two strands, Calculus and Linear Algebra. The Calculus strand covers differential calculus and provides an introduction to integral calculus. The Linear Algebra strand covers matrices, determinants and applications of these in the sub-topic of vector geometry. All of these are presented with accompanying examples from various engineering disciplines.

### DPEN143 Physics for Engineers

This subject covers vectors and their applications, and an introduction to the physical laws of electricity and magnetism, leading to an explanation of the generation of electromagnetic waves and some basic ideas in communication theory. It addresses electric charge and Coulomb's law, electric fields, potential differences, capacitance, dielectrics and relative permittivity, electric current, resistance, Ohm's 'law', superconductivity, DC circuits and Kirchhoffs laws, magnetic fields and forces, electromagnetic waves and the EM spectrum, carrier waves, modulation and bandwidth. It covers waves; reflection and refraction; interference; diffraction; polarization; optical instruments; quantum physics; waves and particles; atomic physics; and the Bohr atom.

### PREP030 Launch

This subject explores the common expectations and experiences of university study in order to assist students to transition effectively to a higher education learning environment. Students will be introduced to the technological platforms and skills required to effectively complete their studies, the importance of academic integrity, available support services and resources, and strategies to develop capabilities of independent learning. Students will be engaged in presentations and activities related to these aspects of academic life to cultivate the development of their student identity in the context of a learning community.

### PREP031 Language for Learning

This subject provides students with opportunities to develop their knowledge of, and competence and confidence in the use of text-based language in preparation for future studies. Students will be introduced to a variety text types and genres commonly used in tertiary study, with a focus on engaging with, and critically analysing, sources of information in terms of purpose for writing, the style employed and writing techniques evident in the text. The focus is on developing language skills and improving students' capability to both evaluate the content of a variety of texts, and to employ that knowledge in their own written and spoken tasks.

### PREP032 Scientific Thinking

This subject provides students with a functional understanding of the basic tenets of science, the underlying cognitive skills that allow us to solve complex problems, and strategies to investigate and interpret the world around us. Students will be challenged with problem-solving activities relevant to the sciences to develop a range of key cognitive capacities, including critical, logical and creative thinking, and an understanding of concepts such as objectivity, variables, theory, and Occam's razor. The focus is on developing skills required to design, conduct, analyse and present the findings of primary research related to a United Nations Sustainable Development Goal (UN SDG). Students will also develop their global citizenship through evaluating the significance of their selected SDG, and its relevance to their future study and career pathways.

## Optional Elective

### DPEN001 Principles of Physics for Engineers

Principles of Physics for Engineers is designed to provide an understanding of some of the physical laws governing the operation of the universe. This subject will prepare students for the study of science and engineering at University. It will also help the student evaluate whether they are able to continue to study physics at university as they are required to do for several science and all engineering subjects.

# 12 Version Control Table

| Version Control | Date Effective | Approved By | Amendment |
|---|---|---|---|
| 1 | 03/04/2025 | UOWCA General Manager | Initial release – Summer 2025 delivery |