

# Diploma of Engineering

## Course Outline (T3, 2018)

<b>Campus</b>	Geelong Waurun Ponds Campus
<b>Intake</b>	March, June, October
<b>CRICOS</b>	063385A
<b>Pre-requisite</b>	<p>Mathematics Year 12 (VCE Specialist Maths or Maths Methods or equivalent).</p> <p>Deakin College offers Foundation Program Mathematics units concurrent with the Diploma of Engineering for students who do not meet the mathematics pre-requisite. Conditions apply. Contact Deakin College for more information, or to sit the Mathematics Assessment test. Note: Australian students are not eligible for FEE-HELP for Foundation Program units.</p>
<b>Course Duration</b>	The duration of the Diploma course is three trimesters (12 months). There is an option, however, to fast track the course and complete it in two trimesters (8 months).
<b>Teaching Methods</b>	Instruction for all units is classroom based. Generally, four hours of class contact per week for 1 credit point unit and eight hours of class contact per week for 2 credit point unit. Some units have additional laboratory hours/practical classes.
<b>Assessment</b>	Assessment for all units is ongoing and continuous consisting of tests, assignments and case study analysis. Most units have a final two-hour examination except for SEJ101, SEJ102 and SEJ103.
<b>Course Structure</b>	Six units must be completed and passed to be awarded the Diploma (8 credit points).
<b>Units</b>	<p><b>Course structure</b></p> <p>Complete and pass six units ( 8 credit points)</p> <ul style="list-style-type: none"> <li>• SEJ101 Design Fundamentals (2 credit points)</li> <li>• SEB101 Engineering Fundamentals (1 credit point)*</li> <li>• SIT172 Programming for Engineers (1 credit point)</li> <li>• SIT194 Introduction to Mathematical Modelling (1 credit point)</li> <li>• SIT199 Applied Algebra and Statistics (1 credit point)</li> <li>• One of SEJ102 Electrical Systems Engineering Project (2 credit points)~ or SEJ103 Materials Engineering Project (2 credit points) ^</li> </ul>

	<p>*For SEB101, SEJ102, and SEJ103, you must complete SEJ010 as co-requisite units</p> <p>^ For students intending to articulate into either the Bachelor of Civil Engineering (Honours) or Bachelor of Mechanical Engineering (Honours)</p> <p>~For students intending to articulate into either the Bachelor of Electrical and Electronics Engineering (Honours) or Bachelor of Mechatronics Engineering (Honours)</p> <p>All Diploma of Engineering students must complete SEJ010 Introduction to Safety and Project Oriented Learning and STP050 Academic Integrity, which are 50-minute online safety training and induction programs. SEJ010 and STP050 are 0 credit point compulsory units and do not count toward your total units.</p>
<p><b>Transfer to Deakin University</b></p>	<p>The following transfer criteria apply:</p> <ul style="list-style-type: none"> <li>• You must complete and pass Six Deakin College Diploma of Engineering units.</li> <li>• You must achieve the required Weighted Average Mark (WAM) for your Deakin College diploma taking into account all units attempted at Deakin College (required WAM's are included under each Deakin University degree on the following page).</li> </ul>

## Diploma of Engineering Example Course Plans for Students

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### Example Course Plans for Students

The following are a series of example course plans for students studying in the Diploma of Engineering at Deakin College.

The following course plans should be used as a guide only. In some cases the order of subjects may be varied. However, choosing course plans that are the same or similar to the suggested plans below should, in most cases, minimise clashes and the time taken to complete your diploma.

### How to use the Plans

Students need to select or choose which Deakin Course they wish to transfer into once they have completed their studies at Deakin College. Deakin offers direct transfer into the following courses

- Bachelor of Civil Engineering (Honours)
- Bachelor of Electrical and Electronics Engineering (Honours)
- Bachelor of Mechanical Engineering (Honours)
- Bachelor of Mechatronics Engineering (Honours)

## Subject Availability – Diploma of Engineering

Subject	Trimester 3 2017	Trimester 1 2018	Trimester 2 2018
SEB101 Engineering Fundamentals	✓	✓	✓
SEJ101 Design Fundamentals	✓	✓	✓
SIT199 Applied Algebra and Statistics	✓	✓	✓
SEJ102 Electrical System Engineering Project	✓	✓	✓
SEJ103 Materials Engineering Project	✓	✓	✓
SIT194 Introduction to Mathematical Modelling	✓	✓	✓
SIT172 Programming for Engineers	✓	✓	✓

## Support Units

Subject	Trimester 3 2017	Trimester 1 2018	Trimester 2 2018
FNDE021 Mathematics I	✓	✓	✓
FNDE023 Mathematics II	✓	✓	✓
FNDE022 Physics	✓	✓	✓

**When I transfer to Deakin I want to study (Please choose one of the following):**

**Bachelor of Civil Engineering (Honours) (WP)**

International Students WAM: **WP 50**

Australian Students WAM: **WP 50**

Credits for Transfer: 8

**Bachelor of Mechanical Engineering (Honours) (WP)**

International Students WAM: **WP 50**

Australian Students WAM: **WP 50**

Credits for Transfer: 8

**Entry to Deakin T1 T2**

**Fast Track (Completing In 8 months/2 trimesters)**

1 <sup>st</sup> Trimester	<b>CORE</b> SEJ101 Design Fundamentals	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>CORE</b> SIT199 Applied Algebra and Statistics	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050
2 <sup>nd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SIT172 Programming for Engineers	<b>CORE</b> SEJ103^ Materials Engineering Project		

**Normal Track (Completing course in 12 months/ 3 Trimesters)**

1 <sup>st</sup> Trimester	<b>CORE</b> SEJ101 Design Fundamentals	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050**
2 <sup>nd</sup> Trimester	<b>CORE</b> SEJ103^ Materials Engineering Project	<b>CORE</b> SIT199 Applied Algebra and Statistics		
3 <sup>rd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SIT172 Programming for Engineers		

**Optional: Support Study Program (Only for Local Australian Students)**

**Support Program (Completing course in 12 months/ 3 Trimesters – see note 2 below)**

1 <sup>st</sup> Trimester	<b>SUPPORT</b> FNDE021** Maths I	<b>CORE</b> SEJ101 Design Fundamentals	<b>SUPPORT</b> (optional) FNDE022 Physics	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050
2 <sup>nd</sup> Trimester	<b>SUPPORT</b> FNDE023** Maths II	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>CORE</b> SIT172 Programming for Engineers	<b>CORE</b> SIT199 Applied Algebra and Statistics	
3 <sup>rd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SEJ103^ Materials Engineering Project			

\* For students intending to articulate into either the Bachelor of Civil Engineering (Honours) or Bachelor of Mechanical Engineering (Honours) must enrol in SEJ103 Materials Engineering Project unit. You are transferring to a new course structure based on project-oriented design based learning (PODBL) from 2<sup>nd</sup> year onwards at Deakin University.

\*\* FNDE021 must be completed before FNDE023, SEB101 and SIT199. FNDE023 must be completed before SIT194.

**Important notes:**

1. For SEB101, SEJ102 and SEJ103 you must complete SEJ010 Introduction to Safety and Project Oriented Learning as a co-requisite unit^
2. The Support Program involves the addition of foundation level mathematic units (FNDE021 and FNDE023) and foundation level physics unit (FNDE022 - optional) to the normal track program in the first trimester. As a consequence the diploma mathematic units (SIT199 and SIT194) occur one trimester later than the normal track program, but can be completed within three trimesters. FNDE021 must be completed before FNDE023, SEB101 and SIT199. FNDE023 must be completed before SIT194. The Support Program is recommended for those students who wish to establish a stronger basis in mathematics and physics. For local Australian students, FNDE021 & FNDE023 are fee-exempt for a first attempt only. Fees apply in all other cases.

**When I transfer to Deakin I want to study (Please choose one of the following):**

**Bachelor of Electrical and Electronics Engineering (Honours) (WP)**

International Students WAM: **WP 50**

Australian Students WAM: **WP 50**

Credits for Transfer: 8

**Bachelor of Mechatronics Engineering (Honours) (WP)**

International Students WAM: **WP 50**

Australian Students WAM: **WP 50**

Credits for Transfer: 8

**Entry to Deakin T1 T2**

**Fast Track (Completing In 8 months/2 trimesters)**

1 <sup>st</sup> Trimester	<b>CORE</b> SEJ101 Design Fundamentals	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>CORE</b> SIT199 Applied Algebra and Statistics	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050
2 <sup>nd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SIT172 Programming for Engineers	<b>CORE</b> SEJ102^ Electrical Systems Engineering Project		

**Normal Track (Completing course in 12 months/ 3 Trimesters)**

1 <sup>st</sup> Trimester	<b>CORE</b> SEJ101 Design Fundamentals	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050
2 <sup>nd</sup> Trimester	<b>CORE</b> SEJ102^ Electrical Systems Engineering Project	<b>CORE</b> SIT199 Applied Algebra and Statistics		
3 <sup>rd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SIT172 Programming for Engineers		

**Optional: Support Study Program (Only for Local Australian Students)**

**Support Program (Completing course in 12 months/ 3 Trimesters – see note 2 below)**

1 <sup>st</sup> Trimester	<b>SUPPORT</b> FNDE021** Maths I	<b>CORE</b> SEJ101 Design Fundamentals	<b>SUPPORT</b> (optional) FNDE022 Physics	<b>Safety Unit</b> (required) SEJ010	<b>Academic Integrity Unit</b> (required) STP050
2 <sup>nd</sup> Trimester	<b>SUPPORT</b> FNDE023** Maths II	<b>CORE</b> SEB101^ Engineering Fundamentals	<b>CORE</b> SIT172 Programming for Engineers	<b>CORE</b> SIT199 Applied Algebra and Statistics	
3 <sup>rd</sup> Trimester	<b>CORE</b> SIT194 Introduction to Mathematical Modelling	<b>CORE</b> SEJ102^ Electrical Systems Engineering Project			

\* For students intending to articulate into either the Bachelor of Electrical and Electronics Engineering (Honours) or Bachelor of Mechatronics Engineering (Honours) must enrol in SEJ102 Electrical System Engineering Project unit. You are transferring to a new course structure based on project-oriented design based learning (PODBL) from 2<sup>nd</sup> year onwards at Deakin University

\*\* FNDE021 must be completed before FNDE023, SEB101 and SIT199. FNDE023 must be completed before SIT194.

**Important notes:**

1. For SEB101, SEJ102 and SEJ103 you must complete SEJ010 Introduction to Safety and Project Oriented Learning as a co-requisite unit^
2. 'The Support Program involves the addition of foundation level mathematic units (FNDE021 and FNDE023) and foundation level physics unit (FNDE022- optional) to the normal track program in the first trimester. As a consequence the diploma mathematic units (SIT199 and SIT194) occur one trimester later than the normal track program, but can be completed within three trimesters. FNDE021 must be completed before FNDE023, SEB101 and SIT199. FNDE023 must be completed before SIT194. The Support Program is recommended for those students who wish to establish a stronger basis in mathematics and physics. For local Australian students, FNDE021 & FNDE023 are fee-exempt for a first attempt only. Fees apply in all other cases.

**Deakin University Campus and Trimester codes**

**WP** Geelong Waurin Ponds Campus

**T1** Trimester 1 entry **T2** Trimester 2 entry

NOTE: for Australian students entry is for T1 only. T2 entry is subject to availability of places.

CRICOS codes: Bachelor of Civil Engineering (Honours) 079998G, Bachelor of Electrical and Electronics Engineering (Honours) 079997G, Bachelor of Mechanical Engineering (Honours) 079996J, Bachelor of Mechatronics Engineering (Honours) 079999F



## Unit Outlines

**PLEASE ENSURE YOU CHECK THE TRIMESTER 1 2018 UNIT OUTLINE FOR ANY CONTENT AND ASSESSMENT UPDATES.**

### **SEJ101 Design Fundamentals\***

SEJ101 focuses on the principles and practice of design. Design is an essential characteristic of professional practice and requires unique knowledge, skills and attitudes common to a number of disciplines. In this unit, students will explore the process of design ideation, definition, prototyping and testing by working on authentic real world problems. The unit will allow students the opportunity to examine humanitarian problems in disadvantaged communities. Learning and assessment activities in this unit will require students to use creative processes to conceive, test and reflect on ideas. Students will be encouraged to view design problem from holistic and atomistic perspectives, paying attention to detail, and showing empathy for biases, values and needs of clients and users. Students will investigate design thinking and strategies, and modelling techniques to generate, evaluate and specify products in order to develop solutions to identified problems.

**Assessment: Humanitarian design project (group) 20%, oral presentation (individual) 10%, design portfolio (individual) 50%, case study report (individual) 20%.**

**To be eligible for a pass in this unit, students must achieve a minimum of 50% on the portfolio and group report.**

### **SIT199 Applied Algebra and Statistics**

This unit includes: the algebra of complex numbers, matrices and sets; probability, and the major discrete and continuous probability distributions. The relationship between exponential functions, trigonometric functions and complex numbers is emphasised and applied to electrical networks. Solutions to systems of linear equations using matrices and determinants, and applications of set

theory and symbolic logic are considered. The statistics techniques and examples studied are relevant to the sciences in general while particular reference is made in the lectures to applications in engineering.

**Assessment: 40% assignments and tasks (class tests), 60% final examination.**

**To be eligible to obtain a pass in this unit, students must achieve a mark or at least 50% in the examination.**

### **SIT194 Introduction to Mathematical Modelling**

This unit includes: functions and limits; derivatives and integrals of combinations of polynomials, exponential, logarithmic and trigonometric functions; sequences, series tests and power series; vectors, lines and planes; first order differential equations. Applications studied include graph sketching; approximations to solutions of equations and integrals; formulation of models to solve science and engineering problems.

**Assessment: 40% four assignments (each worth 10%); 60% final examination**

**To be eligible to obtain a pass in this unit, students must achieve a mark of at least 40% in the examination**

### **SIT172 Programming for Engineers**

On successful completion of this unit, students will have the ability to use a standard approach to program development, as well as understand the structure theorem and be aware of its consequences for algorithm design. They will have the ability to use structured programming techniques to produce modular solutions exhibiting good coupling and cohesion. They will be able to correct syntactic and semantic errors and include error handling in their

software design. Students will use pseudocode to define the solution and develop solutions using spreadsheets, the C Programming language and the Matlab development environment.

**Assessment: 50% assignments; 50% final examination**

## SEB101 Engineering Fundamentals

The unit will commence with a calculus treatment of kinematics of motion in one, two and three dimensions, including parabolic motion. The application of Newton's laws to a wide variety of phenomena will be investigated and the concepts of work, energy and the conservation laws discussed. Rotational kinematics and dynamics will be introduced, including the concepts of moment of inertia, torque, moment of a force. Also introduced are electrical concepts of charge, field, and voltage. Other topics to be covered are vectors, statics, centre of mass and centroids.

**Assessment: Examination 50%, 5 x laboratory reports 30%, In-class tests (2 x 10% each) 20%.**

**To be eligible to obtain a pass in this unit, students must achieve an overall mark of at least 40% in the laboratory reports.**

## SEJ102 Electrical Systems Engineering Project\*

This is a project and design-based unit which introduces students to the fundamentals of electrical systems, covering three main topics; electricity basics including capacitance, resistance, inductance and EMF; electric circuits; and semi-conductor devices. The unit will also introduce students to elements of professional practice including OHS, professional ethics and sustainability in the context of Engineering projects. Students will work in groups, using their knowledge gained through classes, studios and practical experiences, the concepts covered in the seminar sessions, as well as knowledge gained from self-directed learning to complete their design of an electrical systems project meeting specified requirements. Students will communicate the considerations taken in their design in a variety of

forms including written assessments tasks and a group presentation

**Assessment: In-class tests 20%, group design proposal 25%, group presentation 10%, individual portfolio 45%.**

**To be eligible to obtain a pass in this unit, students must receive at least 40% in the Portfolio, and a minimum of 40% on the Group Presentation**

## SEJ103 Materials Engineering Project\*

This unit introduces students to the main classes of materials, their basic structure and the way in which the structure determines their mechanical and functional properties. Case-studies and practicals will be used to highlight the basis for selecting a material in a specific application and to introduce student's to material testing methodologies. The unit will also introduce students to current research into materials to show how the structure can be manipulated to improve performance in specific applications.

During the start of trimester students will undertake various learning activities including classes, tutorials and practical sessions to cover key principles related to materials. Later in trimester students will be predominantly working in groups during tutorial sessions and incorporating both directed and self-directed online learning activities to develop their project and to discuss progress with facilitators. All students will be required on campus during the intensive week for activities related to the project. The unit will also introduce students to elements of professional practice including OHS, professional ethics and sustainability in the context of Engineering projects.

**Assessment: In-class tests (individual) 20%, practical problem task: Material property calculation and identification (individual) 20%, design proposal (group) 25%, design report (individual) 35%.**

**To be eligible to obtain a pass in this unit, students must achieve an overall mark of at least 50% and an average mark of at least 40% in the in-class tests and a mark of at least 40% in the design proposal**

### **SEJ010 Introduction to Safety and Project Oriented Learning (Online)**

This zero credit point unit will provide students entering into an undergraduate Engineering program with credit for prior learning an introduction to the premise of the project oriented design based learning (PODBL) pedagogy and how it is incorporated within the undergraduate Engineering programs. It will introduce students to the 7 step design process. It will also give an introduction to information literacy as used in PODB.

This unit is also includes safety information for students involved in mechanical and electronics laboratory work. The program encompasses mechanical and electronic hazards, building evacuation procedures, laboratory accident management and first aid procedures and safety work procedures particular to laboratory and fieldwork.

***Assessment: This unit is assessed on a pass/fail basis. Multiple-choice on-line test (50 minutes) 100% (Minimum pass rate of 70%). Multiple attempts of the on-line assessment are permitted***

### **STP050 - Academic Integrity (Online)**

STP050 is a compulsory zero credit point unit for all Diploma of Engineering students. The unit learning and assessment activities provides students with guidance on what constitutes academic integrity. It will allow students to develop knowledge, skills and good practice principles to avoid plagiarism and collusion and thereby maintain academic integrity.

***Assessment: Multiple-choice test 100%. To be eligible to obtain a pass in this unit, students must achieve a minimum mark of 70%. Three attempts of the online assessment are permitted.***