

# ENGINEERING

## WHAT TYPE OF SUBJECT IS ENGINEERING?

Engineering includes the study of mechanics, materials science and control technologies through real-world engineering contexts where students engage in problem-based learning and application of STEM knowledge.

Students learn to explore complex, open-ended problems and develop engineered solutions. They recognise and describe engineering problems, determine solution success criteria, develop and communicate ideas and predict, generate, evaluate and refine prototype solutions.

Students justify their decision-making and acknowledge the societal, economic and environmental sustainability of their engineered solutions. The problem-based learning framework in Engineering encourages students to become self-directed learners and develop beneficial collaboration and management skills. It will prepare students to be effective problem solvers as they learn and work with traditional and contemporary and emerging technologies.

## PATHWAYS

A course of study in Engineering can establish a basis for further education and employment in the field of engineering, including, but not limited to, civil, mechanical, mechatronic, electrical, aerospace, mining, process chemical, marine, biomedical, telecommunications, environmental, micro-nano and systems.

The study of engineering will also benefit students wishing to pursue post-school tertiary pathways that lead to careers in architecture, project management, aviation, surveying and spatial sciences.

## OBJECTIVES

By the conclusion of the course of study, students will:

- recognise and describe engineering problems, concepts, and principles
- symbolise and explain ideas and solutions
- analyse problems and information
- determine solution success criteria for engineering problems
- synthesise information and ideas to predict possible solutions
- generate prototype solutions to provide data to assess the accuracy of predictions
- evaluate and refine ideas and solutions to make justified recommendations
- make decisions about and use mode-appropriate features, language, and conventions for particular purposes and contexts

## STRUCTURE

| Unit 1  | Unit 2                         | Unit 3  | Unit 4                           |
|---|--------------------------------|---|----------------------------------|
| <b>Engineering Fundamentals &amp; Society</b> | <b>Emerging Technologies</b>   | <b>Statics of Structures &amp; Environmental Considerations</b> | <b>Machines &amp; Mechanisms</b> |
| Engineering History                           |                                |   |                                  |
| The Problem-Solving Process in Engineering    | Emerging Needs                 | Application of the problem-solving process in Engineering       | Machines in Society              |
| Engineering Communication                     | Emerging Processes & Machinery | Civil Structures & The Environment                              | Materials                        |
| Introduction to Engineering Mechanics         | Emerging Materials             | Engineering Communication                                       | Machine Control                  |
| Introduction to Engineering Materials         | Exploring Autonomy             |   |                                  |

## ASSESSMENT

In Units 1 and 2, all assessment is formative. However, the assessment in Units 1 and 2 will model that which students will encounter in Units 3 and 4. In Units 3 and 4 students complete four summative assessments. The results from each of the assessments are added together to provide a subject score out of 100. Students will also receive an overall subject result (A – E).

| Unit 3  |     | Unit 4   |     |
|---|-----|--|-----|
| Summative Internal Assessment 1 (IA1): Project Folio    | 20% | Summative Internal Assessment 3 (IA3): Project - Folio | 25% |
| Summative Internal Assessment 2 (IA2): Digital Solution | 30% | Summative External Assessment (EA): Examination        | 25% |