Engineering First Year Guide to Enrolment 2021

College of Engineering

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Engineer.

UC ENGINEERING | Te Rāngai Pūkaha

Standard 1-Year First Year (2 semesters) BE(Hons) Engineering First Year Planner

START HERE For Software Engineering

OR

START HERE For All Other Programmes

Take the programme below.
Students who take this programme are also eligible for **Computer** and **Electrical & Electronic Engineering**.

Semester 1	Semester 2
ENGR100*	
ENGR101	EMTH119
EMTH118	MATH120
PHYS101	COSC122
COSC 131	**

*ENGR100 Engineering Academic Skills is an EFTS free, zero-fee course.
**See point 4 (to the right)

1. If you are considering any one of **Chemical & Process, Civil, Natural Resources, Forest or Mechanical Engineering**, you must take Chemistry. Write "CHEM111" into Semester 2 below.
2. If you are considering **Computer or Electrical & Electronic Engineering** you must take COSC122 or MATH120 into Semester 2 below.
3. If you are considering any one of **Civil, Natural Resources, Forest, Mechanical or Mechatronics Engineering**, you must take Structures and Dynamics. Write "ENGR102" into Semester 2 below.
4. If you have any spare boxes below, you must select courses to fill them. A second science course such as PHYS102, CHEM112 or COSC122 is a good idea to keep a pathway open into a related BSc major. Other popular choices are management or geological sciences but you may take courses from other science, forestry, product design, arts, humanities, health, education or law subjects.

Plan here

Semester 1	Semester 2
ENGR100*	
ENGR101	EMTH119
EMTH118	
PHYS101	
COSC131	

*ENGR100 Academic Writing Assessment is an EFTS free, zero-fee course.

Introductory (3-Semester or 2-Year) BE(Hons) Engineering First Year Planner

START HERE if you do not meet course pre-requisites

- The required courses are the same as for the Standard First year but if you do not have sufficient background preparation to take one or more of these courses, you will need to take introductory courses first. See the back page for details on course pre-requisites.
- If you do not have the Mathematics pre-requisites for EMTH118, you must take MATH101 before you can take either EMTH118 or PHYS101. Write MATH101 into Semester 1, then write EMTH118, COSC131 and PHYS101 into Semester 2.
- If you do not have the Physics pre-requisites for PHYS101, you must take PHYS111 first. Write "PHYS111" into Semester 1 and then, if you haven't already done so, write "PHYS101" into Semester 2.
- If you have to take Chemistry but do not have the Chemistry pre-requisites for CHEM111, you must take CHEM114 first. Write "CHEM114" into Semester 1 and then "CHEM111" into Semester 2.
- **Now, use the planner on the previous page** to decide which other main courses you must or wish to do (ignoring the pre-requisites) and then use this to populate the rest of the boxes at the right. Note the semesters in which the courses are available on the last page of this brochure and the following rules: EMTH119 cannot be taken before EMTH118 and COSC131 are completed. ENGR102 cannot be taken before EMTH118 and PHYS101 are completed. In any case, you will need to talk to our Student Advisors about either the summer semester or a 2-year pathway, depending on your background preparation.

Plan here

Semester 1	Semester 2	Summer
ENGR100*		†
ENGR101		†

*ENGR100 Engineering Academic Skills is an EFTS free, zero-fee course.

†Note 1. EMTH119 and ENGR102 are available during the summer semester.

Note 2. If you cannot fit everything in by the end of summer, enrol to take the two-year pathway for First Year Engineering instead.

Course Descriptions

Please check the pre-requisites below carefully. For CIE and IB pre-requisite equivalents, please see www.canterbury.ac.nz/engineering

ENGR100 Engineering Academic Skills

This course is normally taken at the same time as ENGR101 Foundations of Engineering. Students will be tested to assess their academic writing skills. Students who fail the initial assessment will be given feedback indicating their area(s) of weakness, and will have the opportunity to re-sit the assessment. All students are required to pass this course in order to be accepted into the Professional Engineering degree.

ENGR101 Foundations of Engineering

This skills-based course will introduce students to engineering concepts and design by designing and building creative solutions to problems. The central idea of engineering design as a fit-for-purpose solution will be introduced. The course will develop information literacy and communication skills for future engineering studies. **Semester 1**

EMTH118 Engineering Mathematics 1A

A first course in the methods and applications of engineering mathematics. Topics include calculus, linear algebra, and modelling techniques. This course is designed for engineering students who have done well in NCEA Mathematics with calculus. Pre-requisite is NCEA 14 Credits (18 strongly recommended) at level 3 Mathematics (including the standards 'Apply differentiation methods in solving problems (91578)' and 'Apply integration methods in solving problems (91579)')
Semester 1 or Semester 2.

EMTH119 Engineering Mathematics 1B

A continuation of EMTH118. Topics covered include methods and Engineering applications of calculus, differential equations, and linear algebra, along with an introduction to probability. This course is a prerequisite for many courses in engineering mathematics and other subjects at 200 level. **Semester 2 and Summer.**

PHYS101 Engineering Physics A: Mechanics, Waves, Electromagnetism and Thermal Physics

This is a required course for all Engineering Programmes as well as Physics and Astronomy degrees. PHYS101 builds on NCEA level 3 physics to develop Mechanics, Conservation Laws, Fluids, Waves, Thermal Physics, and Electromagnetism into an essential foundation for science and technology understanding. Pre-requisite is 14 credits (18 credits strongly recommended) at NCEA Level 3 Physics, and 14 Credits (18 credits strongly recommended) at NCEA Level 3 Mathematics (including the standards 'Apply differentiation methods in solving problems (91578)' and 'Apply integration methods in solving problems(91579)).
Semester 1 or Semester 2.

ENGR102 Engineering Mechanics

A course for students advancing in Engineering programmes that requires in-depth analysis of components and structures, ENGR102 reinforces concepts of free-body diagrams and the mechanics of real life applications (both statics and dynamics). Pre-requisite is EMTH118.
Semester 2 and Summer.

CHEM111 Chemical Principles and Processes

Atoms and the periodic table; chemical bonding; reduction and oxidation reactions; properties of gases; introduction to thermodynamics; kinetics; chemical equilibrium; Gibbs energy and the second law of thermodynamics; aqueous chemistry; acid-base equilibrium. Pre-requisite is 14 credits NCEA Level 3 Chemistry.
Semester 1 or Semester 2.

Introductory Courses

If you do not have 14 credits at NCEA Level 3 in Chemistry, Mathematics/Calculus or Physics, you may be required to take an Introductory Course.

CHEM114 Foundations of Chemistry

A preparatory course for sciences and other non-specialists, assuming minimal preparation in Chemistry.
Semester 1.

MATH101 Methods of Mathematics

Introduction to calculus, trigonometry and algebra. MATH101 is for students who need some knowledge of mathematics to support other studies such as the earth and life sciences, and for students who wish to prepare for EMTH118 or MATH102. The recommended background for this course is NCEA Level 2 Mathematics or equivalent.
Semester 1.

PHYS111 Introductory Physics for Physical Sciences and Engineering

Designed for students who need to strengthen their background in physics before taking one or more of the advancing 100-level physics papers required for further study in physical sciences or engineering.
Semester 1

Note: MATH 101 cannot be counted towards required courses in the First Year.

COSC131 Introduction to Programming for Engineers

Computer programming in a high-level language with special emphasis on numerical computation. This course is required for first year engineering as a prerequisite for COSC122 and all 200 level COSC and SENG courses.
Semester 1 or Semester 2.

COSC122 Introduction to Computer Science

An introduction to Computer Science, including algorithms, computability, complexity and object-oriented programming.
Semester 2.

MATH120 Discrete Mathematics

Discrete mathematics is that part of mathematics not involving limit processes. It includes logic, the integers, finite structures, sets and networks. **Semester 2.**

For more information

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