

Engineering First Year

Required courses by engineering discipline

	ENGR 100*	ENGR 101	EMTH 118	EMTH 119	PHYS 101	COSC 131	CHEM 111	ENGR 102	COSC 122	MATH 120	Elective	Elective
Chemical and Process												
Civil												
Forest												
Mechanical												
Mechatronics												
Computer												
Electrical and Electronic												
Software												

KEY		Required course
		Choose between MATH 120 and COSC 122
	ENGR 100*	ENGR 100 is a zero-EFTS course (no fees)
	Elective	Elective courses are taken to make a full workload (60 points each semester). An elective course can be another required First Year course for a different discipline to keep options open for multiple engineering disciplines, or another 15 point course offered in a different Faculty for personal interest. Any 15 point course at UC is acceptable as an elective, except MATH 101.

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Course details

Course Code	Title	Course Description
ENGR 100	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. First Year Engineering students will be provided with academic skills, support and help with adjustment to UC Engineering.
ENGR 101	Foundations of Engineering	This skills-based course will introduce students to the “engineering process”. Through a series of lectures, exercises and projects, the students will gain experience in specific skills and activities that contribute to the engineering process. Examples include problem solving, technical sketching, team work, and report writing. Additionally, the importance of sustainability, ethics and biculturalism in an engineering context will be introduced. Students will also gain a better understanding of the different engineering disciplines in regards to a career choice.
EMTH 118	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.
EMTH 119	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.
PHYS 101	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.
CHEM 111	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.
ENGR 102	Engineering Mechanics	A course for students advancing in Engineering programmes that require 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).
COSC 122	Introduction to Computer Science	An introduction to Computer Science, including algorithms, computability, complexity, and object-oriented programming.
COSC 131	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 and is a prerequisite for COSC122 and all 200 level Computer Science and Software Engineering courses.
MATH 120	Discrete Mathematics	Discrete mathematics is that part of mathematics not involving limit processes. It includes logic, the integers, finite structures, sets, and networks.
Elective		Elective courses are taken to make a full workload (60 points each semester). An elective course can be another required First Year course for a different discipline to keep options open for multiple engineering disciplines, or another 15 point course offered in a different Faculty for personal interest.