

8 credits

40.0 h + 40.0 h

Q1

Teacher(s)	Ben-Naoum Abdou Kouider coordinator ;Pereira Olivier ;Verleysen Michel ;Wertz Vincent ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	<ul style="list-style-type: none"> • Mathematical proof techniques. • Analysis : functions of a real variable, first order differential equations. • Linear Algebra : matrix calculus and linear equations. • Discrete mathematics : combinatorics, recurrence equations and graphs. • Modelling of simple problems, and problem solving using the methods cited above.
Aims	<p>Contribution of the course to the program objectives</p> <p>Regarding the learning outcomes of the program of Bachelor in Engineering, this course contributes to the development and the acquisition of the following learning outcomes:</p> <ul style="list-style-type: none"> • LO1.1, 1.2 • LO 2.2, 2.3, 2.4, 2.6, 2.7 • LO 3.1, 3.2, 3.3 • LO 4.1, 4.4 <p>Specific learning outcomes of the course</p> <p>1 More precisely, at the end of the course the students will be able to</p> <ul style="list-style-type: none"> • Manipulate functions of a single real variable ; • Master the elementary notions of linear algebra ; • Master the elementary notions of combinatorics needed to solve counting problem ; • Use first order differential equations, linear recurrence equations and simple discrete structures in order to model and solve problems ; • Understand the main mathematical proof techniques ; • Make a critical reading and analysis of a problem statement; • Find examples and counter-examples related to a mathematical statement; • Write short mathematical proofs with rigor. <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	<p>Written examination about the theory, exercises and problems inspired from the course. The examination is closed book. A particular attention will be devoted to the clarity of the writing, the precision of the answers, including in the use of mathematical notations, and in the justification of the solutions.</p> <p>A written, closed-book, test is organized during the semester.</p> <p>The contribution of this test to the final grade will be as indicated on the Moodle website of the course.</p>
Teaching methods	Lectures in auditorium, supervised exercise and problem sessions, and unsupervised assignments.
Content	<ul style="list-style-type: none"> • Sets, relations, functions, and main proof techniques. • Functions of a single real variable : limits, continuity, derivatives, integration, Taylor polynomials. • Sequences and series. • First order differential equations. • Linear algebra : linear equation systems, matrix calculus, vector spaces on a field, linear applications • Discrete mathematics: combinatorics, recurrence, graphs.
Inline resources	http://moodleucl.uclouvain.be/course/view.php?id=95
Bibliography	<p>Livre « Calculus : a complete course, Robert A. Adams, Christopher Essex », Pearson (dernière édition).</p> <p>Syllabus d'algèbre et de mathématiques discrètes.</p> <p>Syllabus d'exercices et problèmes.</p>
Faculty or entity in charge	BTCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Engineering	FSA1BA	8		