


5.00 credits

30.0 h + 30.0 h

Q1

Teacher(s)	. SOMEBODY ;Glineur François (coordinator) ;Jungers Raphaël ;Remacle Jean-François ;Verleysen Michel ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	functions of a real variable, first order differential equations. Mathematical proof techniques. Modelling of simple problems, and problem solving.
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>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 ; • Use first order differential equations, linear recurrence equations and simple discrete structures in order to model and solve problems ; • Apprehend and visualize a scalar function of two real variables; • Calculate partial derivatives and use them to form a first-order approximation. <p>1</p> <ul style="list-style-type: none"> • 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. • Modelling of simple problems, and problem solving using the methods cited above. <p>This course contributes to the development and the acquisition of the following learning outcomes: LO1.1, 1.2, maybe 2.3, 2.6, 2.7, 3.2, 4.1.</p>
Evaluation methods	<p>Assessments are carried out individually in writing, based on the learning outcomes listed above. A test is organized during the first term, and a written exam during each session.</p> <p>For the January session, the final grade is awarded on the basis of the test (5 points out of 20) and the exam (15 points out of 20). For the other two sessions, the grade is based on the exam only.</p>
Teaching methods	Lectures in a large auditorium, supervised exercise (APE) and problem (APP) sessions in small groups, possibly supplemented with writing assignments and online exercises.
Content	<ul style="list-style-type: none"> • Real numbers, inequalities, sequences and series • Real functions of one variable, limits and continuity, sequences of functions • Derivation and applications, optimization • Taylor polynomial • Complex numbers • Integration and applications • Introduction to differential equations • Introduction to multivariable calculus: topology, continuity, differentiability, partial derivatives and chain rule, gradient and tangent plane for scalar real functions of two variables
Inline resources	https://moodle.uclouvain.be/course/view.php?id=3477
Bibliography	<ul style="list-style-type: none"> • Calculus with Applications par Peter D. Lax et Maria Shea Terrell, Springer, 2014. • Multivariable Calculus with Applications par Peter D. Lax et Maria Shea Terrell, Springer, 2017.
Faculty or entity in charge	BTCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Engineering	FSA1BA	5		
Bachelor in Engineering : Architecture	ARCH1BA	5		