UCLouvain

lepl1102
2020

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Glineur François ;Jungers Raphaël ;Remacle Jean-François (coordinator) ;SOMEBODY ;Wertz Vincent ;
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.
Aims	At the end of the course the students will be able to • 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. • 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. 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: LO1.1, 1.2, maybe 2.3, 2.6, 2.7, 3.2, 4.1. - - - - *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".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Students will be evaluated with an individual written exam, based on the above-mentioned objectives. Results from continuous assessment may also be taken into account for the final grade.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Lectures in a large auditorium, supervised exercise (APE) and problem (APP) sessions in small groups, possibly supplemented with writing assignments and online exercises.
Content	• Real numbers, inequalities, sequences and series • Real functions of one variable, limits and continuity, sequences of functions • Derivation and applications, optimization • Taylor polynomial • Integration and applications • Complex numbers • Introduction to differential equations • Introduction to multivariable calculus: toppology, continuity, differentiability, partial derivatives and chain rule, gradient and tangent plane for scalar real functions of two variables
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=11992
Bibliography	• **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

Force majeure

Evaluation methods	Unless only remote evaluations are allowed by the sanitary rules, the written exam is organized on site. Students unable to participate, as attested by a medical quarantine certificate, will be offered the opportunity to take the exam remotely at the same time. This parallel examination, written and proctored, will be of the same type and will cover the same topics as the main examination.

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Engineering : Architecture	ARCH1BA	5		🔍
Bachelor in Engineering	FSA1BA	5		🔍