UCLouvain

linfo1111

2020

Analysis

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).

7 credits	45.0 h + 37.5 h	Q1

Teacher(s)	Glineur François ;Keunings Roland ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The course focuses on • understanding of mathematical tools and techniques based on a rigorous learning of concepts favored by highlighting their practical application, • careful handling of these tools and techniques in the framework of applications. For most concepts, applications are selected from the other courses of the computer science program (eg economy). Sets and Numbers • sets (intersection, union, difference) • Order and equivalence, • Interval, upper bounds, lower bounds, extremes, • absolute value, powers and roots Real functions of one variable • injective, surjective, bijective functions, • algebraic operations on functions (including graphic interpretation) • first order functions, • exponential, logarithmic and trigonometric functions • Composition of functions and inverse functions Limits • conditions to ensure that a limit exists, • limits to infinity Continuous functions • fundamental theorems of continuous functions, Differentiable functions • derivative at a point (including graphical interpretation) • The Hospital's theorem, • linear approximation of a function, • maximum and minimum, • encreasing of decreasing function (sign study) • concavity and convexity, • Taylor's development Integrals • primitive, • definite integrals (including graphic interpretation) • undefinite integrals Functions of two variables • notion and calculation of partial derivative • graphical interpretation of the gradient • interpretation and calculation of the Hessian matrix • Intuitive introduction to the use of the Hessian matrix and gradient for a 2-variable function to determine critical points and their nature • concept and calculation of double integrals

	For this last part, a mainly "tool" approach will be favored.
Aims	Given the learning outcomes of the "Bachelor in Copputer science" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes: • S1.G1 • S2.2 1 Students completing successfully this course will be able to • Model real problems using the concepts of set, function, limit, derivative and integral; • Solve real problems using computational techniques for limit, derivative and integral; • Reason using correctly the mathematical notations and methods keeping in mind but exceeding a more intuitive understanding of the concepts; • Model real problems using functions of 2 variables. - - - - *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	• Sets and numbers • Real univariate functions • Limits and continuity • Derivatives (computation and applications) • Optimization • Taylor polynomial • Integration (computation and applications) • Functions of two variables
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=10480
Bibliography	Mathématiques pour l'économie par Knut Sydsæter, Peter Hammond et Arne Strøm, Pearson, 2014
Faculty or entity in charge	INFO

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
Master [120] in Data Science : Statistic	DATS2M	7		
Bachelor in Computer Science	SINF1BA	7		