


Teacher(s)	Ben-Naoum Abdou Kouider ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	<p>The course focuses on</p> <ul style="list-style-type: none"> • 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. <p>For most concepts, applications are selected from the other courses of the computer science program (eg economy).</p> <p>Sets and Numbers</p> <ul style="list-style-type: none"> • sets (intersection, union, difference) • Order and equivalence, • Interval, upper bounds, lower bounds, extremes, • absolute value, powers and roots <p>Real functions of one variable</p> <ul style="list-style-type: none"> • 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 <p>Limits</p> <ul style="list-style-type: none"> • conditions to ensure that a limit exists, • limits to infinity <p>Continuous functions</p> <ul style="list-style-type: none"> • fundamental theorems of continuous functions, <p>Differentiable functions</p> <ul style="list-style-type: none"> • 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 <p>Integrals</p> <ul style="list-style-type: none"> • primitive, • definite integrals (including graphic interpretation) • undefinite integrals <p>Functions of two variables</p> <ul style="list-style-type: none"> • 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 <p>For this last part, a mainly "tool" approach will be favored.</p>
Aims	<p>1 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:</p>

	<ul style="list-style-type: none">• S1.G1• S2.2 <p>Students completing successfully this course will be able to</p> <ul style="list-style-type: none">• 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. <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>
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Computer Science	SINF1BA	7		
Master [120] in data Science: Statistic	DATS2M	7		