

9.0 credits	45.0 h + 45.0 h	2q
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Teacher(s) :	Vitale Enrico (coordinator) ; Glineur François ; Keunings Roland ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>Functions of several real variables ; vector analysis ; linear algebra ; linear differential equations with constant coefficients ; introduction to data analysis and reasoning in a context of random uncertainty.</p> <p>Study and handling of the above-mentioned concepts for their use in later courses. Training in the domains of rigor and abstraction by studying important proofs in calculus or algebra, and by constructing proofs featuring interaction between several different concepts or notions.</p> <p>Resolution of problems or exercises requiring the use of several mathematical tools.</p>
Aims :	<p>After completing this course, students will be able to:</p> <ul style="list-style-type: none"> Handle functions of several real variables. Master advanced notions in linear algebra. Conduct mathematical reasoning and write short proofs in a rigorous manner. Understand and use different proof techniques. Deal with problems, exercises and proofs for which not all data is provided explicitly. Interpret a problem, exercise or statement from various points of view (e.g. algebraic point of view or geometric point of view). Model mathematical situations involving random elements. Solve exercises and understand results whose difficulty warrants formal definitions and advanced theorems. Approach theories whose formalism exceeds the framework of intuitive examples and which require abstraction. <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>
Content :	<p>Functions of several real variables: surfaces, level curves ; limit and continuity ; directional derivatives, differentiability, tangent plane, Jacobian ; derivatives of composite functions ; higher order derivatives ; implicit functions ; extremums ; multiple integrals.</p> <p>Vector analysis: gradient, divergence, curl ; line and surface integrals ; integral theorems (Green's theorem, Stokes' theorem, divergence theorem).</p> <p>Linear algebra: Euclidean spaces ; eigenvalues ; quadratic forms and geometrical interpretation ; linear differential equations with constant coefficients ; linear regression and interpretation.</p> <p>Methods used will favor the students' active learning. The actual implementation details of the students' active participation in their training are left to the course holders, while respecting the Faculty's teaching orientations.</p>
Other infos :	none
Cycle and year of study :	<p>> Bachelor in Engineering : Architecture</p> <p>> Bachelor in Engineering</p> <p>> Preparatory year for Master in Actuarial Science</p>
Faculty or entity in charge:	BTCI