



5 credits

30.0 h

Q1

Teacher(s)	Vrins Frédéric ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	<ol style="list-style-type: none"> <li>1. Part I: Basic probability concepts (probability space, sigma-fields, random variables, distribution, statistics and sampling via Monte Carlo).</li> <li>2. Part II : Stochastic processes and related concepts.</li> <li>3. Part III : random walks and Brownian motion.</li> <li>4. Part IV : stochastic calculus (stochastic integrals, stochastic differential equation, Ito's lemma, Girsanov theorem)</li> </ol>
Aims	<p><b>During their programme, students of the LSM Master's in management or Master's in Business engineering will have developed the following capabilities'</b></p> <p>2.2. Master highly specific knowledge in one or two areas of management : advanced and current research-based knowledge and methods.</p> <p>2.4. Activate and apply the acquired knowledge accordingly to solve a problem.</p> <p>3.1. Conduct a clear, structured, analytical reasoning by applying, and eventually adapting, scientifically based conceptual frameworks and models, to define and analyze a problem.</p> <p>3.5. Produce, through analysis and diagnosis, implementable solutions in context and identify priorities for action.</p> <p>6.1. Work in a team : Join in and collaborate with team members. Be open and take into consideration the different points of view and ways of thinking, manage differences and conflicts constructively, accept diversity.</p> <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>
Evaluation methods	<p>An oral exam (60%) made of two parts :</p> <ol style="list-style-type: none"> <li>1. A practical part (test student's skills to apply and use the main concepts)</li> <li>2. A theoretical part (evaluate the understanding depth).</li> </ol> <p>Teamworks during the year (25%) and an individual work (15%) that will be discussed during the exam.</p>
Teaching methods	<p>15 courses of 2h each including programming sessions on R.</p> <p>Students will be asked to prepare some courses. The objective of the group and home works is to make the concepts more concrete.</p>
Content	<p>Fundamental mathematical concepts to understand the behavior of systems whose behavior features randomness. These skills will be extensively used in LLSMS2226 (derivatives pricing)</p>
Bibliography	<p>Slides, reference books and R code</p> <p><b>lectures conseillées :</b></p> <ul style="list-style-type: none"> <li>• Hassler, Stochastic Processes and Calculus: an elementary introductions with applications, Springer 2016</li> <li>• Mikosh, M. Elementary Stochastic Calculus (with Finance in view), Wolrd Scientific, 1998.</li> <li>• Joshi, M. : Concepts and Practice of Mathematical Finance, Cambridge University Press, 2003.</li> <li>• Shreve, S. : Stochastic calculus for Finance I &amp; II, Springer 2004.</li> </ul>
Faculty or entity in charge	CLSM

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Business Engineering	<a href="#">INGE2M</a>	5		
Master [120] in Economics: General	<a href="#">ECON2M</a>	5		
Master [120] in Business Engineering	<a href="#">INGM2M</a>	5		