

Course Title	Computational Finance				
Course Code	AEM660				
Course Type	Compulsory				
Level	Master (2 nd Cycle)				
Year / Semester	1 st Year / 2 nd Semester				
Teacher's Name	TBA				
ECTS	10	Lectures / week	3 Hours / 14 weeks	Laboratories / week	None
Course Purpose and Objectives	<p>Students through this course will be able to study the scientific computing and quantitative skills and apply those in pricing financial derivatives and will be familiarized with the new technological developments in this field. The course covers basic stochastic modeling with hands-on practice in R, in order to value different financial products using the Monte Carlo and Binomial Tree methods, perform variance reduction techniques and other advanced quantitative methods. Direct Market Access is introduced to students with the applications in electronic trading.</p>				
Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • Manage basic scientific computing skills; • Simulate the financial products' dynamics and implementing pricing models of derivatives through Monte Carlo method and Binomial Trees; • Implement the computing tools to program • Manage the direct market access; • Understand, apply and critically evaluate the algorithmic trading systems and trading strategies; 				
Prerequisites	Successful completion of 1 st and 2 nd semester courses		Co-requisites	None	
Course Content	<ul style="list-style-type: none"> • Refresh on key statistical principles, and introduction to asset prices and stock price dynamics • Introduction to Monte Carlo method and simulations for <ul style="list-style-type: none"> ➤ generating random numbers, ➤ pricing of European/Vanilla call/put options ➤ pricing other path-dependent options ➤ studying variance reduction techniques ➤ performing advanced applications in higher dimensions and/or complicated option payoffs • Introduction to the Binomial Tree method for <ul style="list-style-type: none"> ➤ pricing European/Vanilla call/put options ➤ applications to early-exercise options ➤ hedging derivatives ➤ performing advanced applications in higher dimensions and/or complicated option payoffs 				

	<ul style="list-style-type: none"> • Introduction to Direct Market Access is introduced to students with basic applications in electronic trading <ul style="list-style-type: none"> ➤ theory on orders and algorithms ➤ Implementing trading strategies 								
Teaching Methodology	Face-to-Face.								
Bibliography	<p>Glasserman, P. Monte Carlo Methods in Financial Engineering, Latest Edition, Springer.</p> <p>Hull J. C. Options, Futures, and other derivatives, Eighth Edition, Prentice Hall.</p> <p>Ruppert D. and Matteson D. S. Statistics and Data Analysis for Financial Engineering with R examples, Second Edition, Springer.</p> <p>Johnson B. Algorithmic Trading and DMA: An introduction to direct access trading strategies, Latest Edition, 4Myeloma Press.</p>								
Assessment	<table border="1"> <tr> <td>Examinations</td> <td>50%</td> </tr> <tr> <td>Assignments</td> <td>40%</td> </tr> <tr> <td>Class Participation and Attendance</td> <td>10%</td> </tr> <tr> <td></td> <td>100%</td> </tr> </table>	Examinations	50%	Assignments	40%	Class Participation and Attendance	10%		100%
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Language	English								