

NAME OF THE COURSE		Advanced Financial Modeling: Derivatives					
Code	EUAD05	Year of study	Second year of the graduate program				
Course teacher	Prof. Branka Marasović, PhD,	Credits (ECTS)	5				
Associate teachers	Tea Kalinić, mag. math.	Type of instruction (number of hours)	L	S	E	F	
			26		26		
Status of the course	Elective	Percentage of application of e-learning	30%				
COURSE DESCRIPTION							
Course objectives	The main objective of the course is to provide a thorough understanding of theoretical models for valuing financial derivatives and to develop risk management skills in a dynamic market environment. The emphasis is on critical thinking and the practical application of knowledge in financial decision-making.						
Course enrolment requirements and entry competences required for the course	This elective course is open to all second-year graduate students, regardless of their specialization, provided they meet the requirements set by the Statute of the Faculty of Economics in Split and the Regulations on Study and Studying.						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Learning outcome of the subject: Critically assess financial derivatives and their valuation methods and apply them in risk management and investment decision-making. Specific learning outcomes: 1. Evaluate the impact of financial derivatives on risk management and investment decision-making. 2. Assess the applicability of different derivative valuation models in real market conditions. 3. Predict the consequences of using derivatives for hedging and speculation. 4. Justify the advantages and limitations of various valuation methods for options, forwards, futures, and swaps. 5. Develop trading strategies and apply derivative valuation models using Excel and/or Python. 6. Create simulation models for risk assessment of portfolios that include derivatives.						
Course content broken down in detail by weekly class schedule (syllabus)	Lectures		Exercises				
	Topic	Hours	Topic	Hours			
	Introduction to financial derivatives. Definition and role of financial derivatives in the financial system. Historical development of the derivatives market. Fundamental elements of derivatives.	2	Introduction to financial derivatives. Definition and role of financial derivatives in the financial system. Historical development of the derivatives market. Fundamental elements of derivatives.	2			

	Characteristics and application of forward contracts Use of forwards for hedging and speculation. Valuation of forward contracts – arbitrage approach, discounting future cash flows, and the impact of interest rates.	2	Characteristics and application of forward contracts. Use of forwards for hedging and speculation. Valuation of forward contracts – arbitrage approach, discounting future cash flows, and the impact of interest rates.	2	
	Structure and characteristics of futures contracts. Differences between forwards and futures. The futures market and the role of clearinghouses. Valuation of futures contracts – daily settlement and the impact of interest rates. Application of futures in hedging and speculation.	2	Structure and characteristics of futures contracts. Differences between forwards and futures. The futures market and the role of clearinghouses. Valuation of futures contracts – daily settlement and the impact of interest rates. Application of futures in hedging and speculation.	2	
	Types of swap contracts (interest rate swaps, currency swaps, commodity swaps). Functioning of the swap market and contract agreements. Valuation methods for swaps – present value of future cash flows, application of discount factors, and the role of reference interest rates.	2	Types of swap contracts (interest rate swaps, currency swaps, commodity swaps). Functioning of the swap market and contract agreements. Valuation methods for swaps – present value of future cash flows, application of discount factors, and the role of reference interest rates.	2	
	Concept and importance of options contracts. Differences between options and other derivatives. Overview of the options market. Call and put options. American vs. European options. Long and short positions in options. Combined options strategies.	2	Concept and importance of options contracts. Differences between options and other derivatives. Overview of the options market. Call and put options. American vs. European options. Long and short positions in options. Combined options strategies.	2	
	Factors determining option prices. Black-Scholes formula for pricing European options. Model assumptions and limitations. Binomial model for option valuation.	2	Factors determining option prices. Black-Scholes formula for pricing European options. Model assumptions and limitations. Binomial model for option valuation.	2	

	Bjersund-Stensland method for approximating the value of American options. Application of different methods in practice. Comparison of different valuation models for American options.	2	Bjersund-Stensland method for approximating the value of American options. Application of different methods in practice. Comparison of different valuation models for American options.	2		
	Currency options: structure and trading mechanisms. Valuation of currency options.	2	Currency options: structure and trading mechanisms. Valuation of currency options.	2		
	Options on stock indices. Binary options, their applications, and valuation.	2	Options on stock indices. Binary options, their applications, and valuation.	2		
	Interest rate options (cap, floor, collar). Models for valuing interest rate options. Valuation of options under negative interest rates.	2	Interest rate options (cap, floor, collar). Models for valuing interest rate options. Valuation of options under negative interest rates.	2		
	Sensitivity analysis of option prices, option Greeks.	2	Sensitivity analysis of option prices, option Greeks.	2		
	Options in the context of portfolio theory. Portfolio simulation with derivatives and risk analysis.	2	Options in the context of portfolio theory. Portfolio simulation with derivatives and risk analysis.	2		
	Analysis of real market data. Final discussion and preparation for seminar paper.	2	Analysis of real market data. Final discussion and preparation for seminar paper.	2		
Format of instruction	☐ lectures ☐ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)			
Student responsibilities	Students are required to attend classes. The prerequisite for obtaining a signature is a minimum attendance of 70% of lectures and 70% of exercises.					
Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Class attendance	2	Research		Practical training	
	Experimental work		Report		Self-evaluation quizzes	
	Essay		Seminar essay	1	(Other)	
	Tests	1.5*	Oral exam	0,5	(Other)	
	Written exam	1,5*	Project		(Other)	

Grading and evaluating student work in class and at the final exam	To achieve a passing grade, students must complete computer-based tasks through tests during the semester or in the exam period, using either Excel or Python, according to their preference. Additionally, they are required to prepare an independent project, which is defended before the course professor. The final grade is determined as the average of the grades obtained from the computer-based written part and the seminar paper.		
Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media
	Ercegovac, Roberto; Marasović, Branka; Čular, Marko 82021): FINANCIJSKE IZVEDENICE: PRINCIPI I PRIMJENA. Split: Ekonomski fakultet Sveučilišta u Splitu	5	
	Orsag Silvije (2006), IZVEDENICE, Zagreb, HUFA	2	
	Aljinović, Z., B. Marasović, B. Šego, Financijsko modeliranje, II. izmijenjeno i dopunjeno izdanje. Sveučilišni udžbenik, (317 str.+CD), Sveučilište u Splitu, Ekonomski fakultet, Split, 2011.	11	
Optional literature (at the time of submission of study programme proposal)	Haug, E. G. (2007): The complete guide to option pricing formulas. McGraw-Hill, New-York, second edition. Hull, J. C. (2006): Options, Futures, and Other Derivatives. Prentice-Hall, New Jersey, sixth edition. Aljinović, Z., B. Marasović, B. Šego (2009): Vrednovanje opcija Black-Scholesovim modelom i binomnim modelom upotrebom Excela, Računovodstvo i financije 12, str. 118-124, ISSN: 0350-4506 (pregledni rad). Aljinović, Z., B. Marasović, K. Jurun (2009): An Application of Excel and VBA in Comparison of Lattice Based Option Pricing Models, Proceedings of the 32rd International Convention MIPRO, Computers in Education, Opatija, Croatia, pp. 140-144; ISBN: 978-953-233-042-7. Marasović, B. (2013): Binomial and trinomial trees versus Bjerksund and Stensland approximations for american options pricing, Proceedings of the 6th International Conference on Information Technology, Faculty of Science & IT, Al-Zaytoonah University of Jordan, Amman, Jordan, (extended abstract, full text on CD-ROM pp.1-8, ISBN: 978-9957-8583-1-5); baze citiranja: INSPEC.		
Quality assurance methods that ensure the acquisition of exit competences	Registering students' success in carrying out of their duties (lecturer). Monitoring lectures and practice sessions (Vice Dean for Education). Students' Performance analysis in each course (Vice Dean for Education). Student questionnaire on the quality of lecturers and lessons for each course (University of Split, Quality Assurance Centre) Examination is used as an instrument to evaluate individual course outcomes by the course lecturer. The content of exam is reassessed periodically in order to assure compliance with the course outcomes.		
Other (as the proposer wishes to add)	The course is taught in Croatian.		