AFIN307 - Finance in continuous time

Course Title	Finance in continuous time				
Course Code	AFIN307				
Course Type	Elective				
Level	BA (Level 1)				
Year / Semester	4th year				
Teacher's Name	Dr. Nicos Koussis				
ECTS	6	Lectures / week	3	Laboratories/week	
Course Purpose	This is an advanced course in finance which introduces students to modern finance techniques in continuous time under uncertainty. The course introduces students to modeling uncertainty and stochastic processes and explains valuation using the contingent claims (real option approach) in continuous time. The course applies the knowledge in two main areas in finance, the analysis of real investment opportunities and optimal capital structure.				
Learning Outcomes	1. Distinguish between various forms of stochastic processes and apply Ito's lemma 2. Explain the derivation of Black and Scholes partial differential equations using replication arguments 3. Compute general solutions of frequently occurring partial differential equations for evaluating investment opportunities 4. Value equity and debt claims using Leland's (1994) model with endogenous bankruptcy 5. Evaluate and assess agency conflicts within the Leland framework 6. Analyze other general framework incorporating both investment and capital structure decisions under uncertainty 7. Use programming software to develop models				
Prerequisites	AFIN203	Corequisites	None		
Course Content	Stochastic process: developing concepts with simple examples, types of stochastic processes, Wiener process, Ito's lemma and applications, basic software simulation strategies Dynamic optimization: basic models, dynamic programming, contingent claim valuation, sensitivity analysis using software				

	The value of investment opportunities: no operating costs, operating costs and temporary suspension, entry and exit strategies Valuation of equity and debt: Leland's (1994) framework, optimal decisions for endogenous default, firm value breakdown and tax benefits and bankruptcy costs, sensitivity analysis of the basic framework Extensions of the basic framework: Mauer and Sarkar (2005) and subsequent models, optimal investment timing and capital structure, agency conflicts modeling, sensitivity analysis
Teaching Methodology	The course is delivered to the students by means of lecturers, conducted with the help of computer presentations and the use of the board. The lecturer provides demonstrations and examples and R programming code. Students are then asked to expand on this knowledge by solving problems and applying their knowledge in a group project. Lecture notes and other course material like spreadsheets and R programs examples are available to students through the e-learning platform.
Bibliography	(a) Textbook: R. Pindyck and A. Dixit, Investment Under Uncertainty, 1994, Princeton University Press. Lenos Trigeorgis, Real Options: Managerial Flexibility and Strategy in Resource Allocation, The MIT Press (March 14, 1996) (b) References: J. Hull Options, Futures and Other Derivatives, Pearson/Prentice Hall, Pearson; 10 edition (January 30, 2017) Selected journal articles: Leland, H. E. (1994). Corporate debt value, bond covenants, and optimal capital structure. The journal of finance, 49(4), 1213-1252. Mauer, D. C., & Sarkar, S. (2005). Real options, agency conflicts, and optimal capital structure. Journal of banking & Finance, 29(6), 1405-1428.
Assessment	(a) Methods: Students will be assessed with course work that involves written and assignments (quizzes), a small group project and a midterm and a final test. The course involves both explaining concepts and numerical problems. (b) Criteria: Assessment criteria are available in each written assignment, midterm or in the final exam (c) Weights: • Assignments (including computer based) 20% • Midterm 20% • Final Exam 60%
Language	English language