

<b>Course No.: MATH 625 Lec Q1.</b> <b>Days, Room and Time: TBA</b> <b>Course Title: Advanced Mathematical Finance.</b>	<b>Core Course: Yes.</b>  <b>Term: Winter 2018.</b>
<b>Instructor: Professor Alexander MELNIKOV</b> <b>CAB 589, ph. 492-0568, e-mail: melnikov@ualberta.ca</b>	
<p><b>Syllabus:</b> The course includes those topics of Mathematical Finance that are not covered by Math 515 and Math 520. One of the main goals is to provide students with a knowledge of fixed-income securities (bonds) and fixed-income instruments. Such a market represents the largest financial market, even larger than equities. So, a good knowledge of bonds and their instruments is essential.</p> <p>The course covers pricing and risk management of fixed-income products and credit risks. It will be shown how the theory of defaultable contingent claims can be applied to equity-linked life insurance.</p> <p>Option pricing theory will be covered in several directions not presented in Math 515 and Math 520 : stochastic volatility modeling, estimation of volatility, valuation of option prices under return distributions with skewness and kurtosis different from normal, valuation of bounds of option prices by means of stochastic dominance and other techniques.</p> <p>A semimartingale financial market model will be developed as a more general market model for variety of classical models: the Black-Scholes model, the Merton model, Binomial and Jump-Diffusion models. Perfect and imperfect hedging as well as optimal investment via expected utility maximization will be presented.</p> <p>As a form of a home work and a grading system for such extended course research-oriented projects will be proposed. These projects will be adjusted to the research topic of each student providing a better research environment for successful work under Master and PhD thesis.</p>	
<b>Prerequisite: Math 505 and Math 515 or consent of the Department</b>	
<p>The aim of the course is challenging, and hence, it is not possible to cover all topics using just one textbook. That is why lectures will be based on different books and even papers to cover all declared topics and will provide all necessary material. The <b>books</b> below give a base for a helpful reading:</p> <p><b>A. Melnikov, Risk Analysis in Finance and Insurance, CRC Press, 2011.</b>  <b>R. Cont, P. Tankov, Financial Modelling with Jump Processes, CRC Press, 2004.</b>  <b>S.Shreve, Stochastic Calculus for Finance II, Springer-Verlag, N.Y., 2004.</b></p>	
<b>Grading: Research-oriented project-100%.</b>	