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SAMPLE SYLLABUS
This document is published as an indication of the core content of the course. Instructors have responsibility of deciding on additional topics to be included, and the emphasis, ordering, and pacing of presentation.

Course Number: **MTH 459**

Course Title: **Mathematical Finance II**

Credit Hours: **3**

Textbook: **D. G. Luenberger, *Investment Science*. Oxford Press, Second edition 2013.**

Desmond J. Higham, *An Introduction to Financial Option Valuation: Mathematics, Stochastics and Computation*. Cambridge Univ. Press, 2004.

Prerequisites: MTH 458

Topics
Utility functions.
Forwards, futures, and swaps.
Computer Simulation: pseudo random numbers, numerical solution of equations, Monte Carlo methods.
Risk Neutral Pricing and Implied Volatility.
American Options: Black-Scholes, the optimal exercise boundary, and Monte Carlo methods.
Dividends: The effect of continuous and discrete dividend payments on option prices.
Exotic Options: digital options, lookback options, barrier options, Asian options, maybe more.
Historical Volatility and Monte Carlo methods: estimation of parameters and variance reduction.
Finite Difference methods: forward and backward Euler method, Crank-Nicholson, application to Black-Scholes.