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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 458**

Course Title: **Mathematical Finance I**

Credit Hours: **3**

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

Prerequisite: MTH 241
Corequisite: MTH 306

Topics
Introduction: cash flows, investments and markets, comparison, arbitrage, dynamics, risk, pricing, hedging, random cash flow streams, derivative securities.
Mean-variance Portfolio Theory: asset return, random variables, random returns, portfolio mean and variance, Markowitz minimum variance portfolio, two-fund theorem, inclusion of a risk-free asset, one fund theorem.
Capital Asset Pricing Model (CAPM): market equilibrium, market lines, performance evaluation, CAPM as a pricing formula.
Models and Data: data and parameter estimation.
Models of Asset Dynamics: binomial lattice model, introduction to stochastic differential equations (random walks, Ito's lemma).
Basic Options Theory: basic options, put-call parity.
Black-Sholes Equation for Option Pricing: derivation of the Black-Scholes equation, analytical solutions for special cases.