# MATH 486 / 586
# Risk Management and Financial Engineering   (3 units)

# Course Outline

| Topics | # of Weeks |
| --- | --- |
| **Cash Flow Engineering and Forward Contract** | 1.0 |
| **Engineering Simple Interest Rate Derivatives** | 1.0 |
| **Introduction to Swap Engineering** | 1.0 |
| **Pricing Tools and Financial Engineering** | 1.0 |
| **Some Application of the Fundamental Theorem** | 1.0 |
| **A Framework for Fixed-Income Engineering:**<br>    1. Framework for Swaps<br>    2. Term Structure Modeling<br>    3. Measure Change Techniques | 2.0 |
| **Risk Measures: Value at Risk and Conditional Tail Expectation** | 1.0 |
| **Monte Carlo Valuation of Derivative Securities** | 2.5 |
| **Swaptions** | 0.5 |
| **Portfolio Management: Risk and Expected Return on Portfolio:**<br>    1. Risk and Expected Return on a Portfolio<br>    2. Efficient Frontier<br>    3. Capital Asset Pricing Model | 2.0 |
| **Exams and Presentations:** | 1.0 |

**Textbook:**    Derivative Markets, 2nd Edition, by McDonald
Laboratory Materials for Mathematical Finance Using Excel, by Ohoe Kim
Principles of Financial Engineering, by Salih N. Neftci

**Requirements:**  Graduate students need to complete an additional project on a selected topic. Computer laboratories are an integral part of the course.

Adopted: March 2007