This course will provide practical applications of MATLAB functions and programming to fundamental financial instruments, such as bonds and stocks, and their derivatives. Though this is an introductory course, where mathematical and programming tools will be kept at a basic level, students must be familiar with undergraduate calculus and be comfortable with elementary programming.

This course is primarily designed for Master of Science in Finance students. By the end of this course, they should gain enough confidence and appreciation for quantitative finance to make them comfortable interacting with potential “quants” colleagues in the financial industry.

Recommended textbook:
*Numerical Methods in Finance and Economics: A MATLAB-Based Introduction*, by Paolo Brandimarte, published by Wiley (2006). We will cover only a portion of the material included in this book (mostly chapters 1, 2, 7, 8, and 9.)

Slides based on these chapters will be provided.

Course Outline:

1. Foundations
   - Need for computational methods
   - Pricing accuracy, option books, and market efficiency
   - Basics of MATLAB: elementary programming and financial/derivatives toolboxes

2. Fixed-income securities: analysis and portfolio immunization
   - Compounding and interest value
   - Basic pricing of fixed-income securities
   - Interest rate sensitivities and bond portfolio immunization
   - MATLAB functions for fixed-income securities

3. Portfolio optimization
   - Mean-variance optimization
   - Alternative measures:
     - Value-at-Risk and quantile-based measures
4. Derivatives pricing
   - Binomial model
   - Black-Scholes model
   - Monte Carlo method
   - American options
   - Path-dependent options: barrier, Asian, and look-back

Grading:

Final grade based on:
   - Four programming assignments (each worth 20%)        80%
   - Class participation                                                                 20%.

For each programming assignment, you will be evaluated on your ability to compute correctly prices of financial derivatives (80% weight) as well as programming efficiency (10%) and style (10%). Computational methods in the real-world are complex and interconnected, with various portions developed by different individuals, thus making efficiency and style critical to their integration.

The course weighted average will be computed on a scale from 0 to 100. The letter grade breakdown will be as follows:

- A: 90 – 100
- B+: 80 – 90
- B: 70 – 80
- C+: 65 – 70
- C: 60 – 65
- D+: 55 -- 60
- D: 50 -- 55
- F: less than 50

General policies:

- Class attendance is mandatory and participation will affect the final grade. Students are therefore strongly encouraged to avoid electronic distractions (e-mail, cell phone texting, web browsing, etc.) during lectures.
- There are no exams but programming assignments must be turned in on time and will be subject to penalties if late.
- Information on current UF grading policies for assigning grade points can be consulted through the following link: [https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)
- Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.