# University of Connecticut
# Math 2620: Financial Mathematics I
# Syllabus - Spring 2009

**Welcome to Math 2620!**

This is an important foundation course in actuarial science and finance, with two principal goals for students:

- The first, and most important, goal is to master the fundamental concepts of financial mathematics, as listed in the following section, "Learning Objectives."
- The second goal is to begin preparation for SOA Exam FM (CAS Exam 2). However, this is not an exam preparation course; it covers many, but not all, of the topics for Exam FM/2. (Math 3615 is the preparation course for Exam FM/2.)

In addition, this course provides students an introduction to the mathematical principles underlying personal financial management.

**Learning Objectives:**

**Knowledge of Key Terms**

- Simple and compound rates of interest and discount
- Nominal and effective rates of interest and discount
- Force of interest
- Equivalent interest measures
- Equation of value
- Present value, future value, and current value
- Annuities and perpetuities
- Yield rates
- Arithmetic and geometric average rates of return
- Spot rates and forward rates
- Duration, convexity, and immunization
- Yield curves and the term structure of interest rates
- Bonds, mortgages, stocks, and other financial instruments

**Understanding of Key Procedures**

- Calculate equivalent interest rates
- Calculate the value of an annuity or a perpetuity
- Calculate a present value or accumulated value, given a set of cash flows, the method of crediting interest, and the applicable term structure of interest rates
- Calculate the yield rate (if it exists) for a given set of cash flows
- Calculate a loan payment amount and the corresponding loan amortization schedule
- Calculate the price, duration, and convexity of a bond
- Calculate a spot rate curve, given a yield curve
- Calculate forward rates, given a spot rate curve
- Calculate the duration and convexity of a series of cash flows

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**Textbook:** ***Financial Mathematics I*, 2008, by Louis J. Lombardi**

**References:**[1]

*Mathematics of Investment and Credit (Fourth Edition)*, 2008, by Samuel A. Broverman;

*Financial Mathematics: A Practical Guide for Actuaries and other Business Professionals (Second Edition)*, 2005, by Chris Ruckman, & Joe Francis

*Fixed Income Mathematics (Fourth Edition)*, 2006, by Frank J. Fabozzi;

[1] The student is not expected to purchase these books.

**Calculator:** A financial calculator, such as TI's **BA II Plus**, is required for this course. Although other financial calculators are able to perform all or most of the same functions as the **BA II Plus**, the specific procedures for the **BA II Plus** will be the basis of the calculator solutions and methods discussed in class and in the handouts.

The **BA II Plus Professional** is a somewhat more expensive version of the **BA II Plus**. The few additional functions that it provides will not be required for this course. However, I consider the Professional model to be a better choice for usability reasons.

**PLEASE BRING YOUR CALCULATOR TO EVERY CLASS.**

**Instructor:** John B. Dinius, FSA

Office: MSB 121
Office hours: Tu Th 12:30-2, or by appointment
Office Phone: (860) 486-4236
E-mail: dinius@math.uconn.edu

**Important Note:** The fastest and most reliable way to contact me is by e-mail.

**Course Website:** http://www.math.uconn.edu/~dinius/math2620s09/

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**Grading Plan:**

| | |
|---|---|
| 60% | Four Tests[2] |
| 25% | Final Exam |
| 15% | Quizzes & Homework |
| 100% | Overall Grade[3] |

Materials permitted for quizzes, tests and final exam:
Pen or pencil, financial calculator, and watch
(no papers, other than the test paper)

[2] Your lowest score on the four tests will be dropped, and 60% of your course grade will be based on the average of the other three tests. Because your lowest test score will be dropped, no make-up tests will be given.

[3] Your overall grade in the course may be increased (but not decreased) based on attendance, class participation, and extra credit assignments.

**Academic Integrity:**

A fundamental tenet of all educational institutions is academic honesty; academic work depends upon respect for and acknowledgement of the research and ideas of others. Misrepresenting someone else's work as one's own is a serious offense in any academic setting and it will not be condoned.

Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g. papers, projects, and examinations); any attempt to influence improperly (e.g. bribery, threats) any member of the faculty, staff, or administration of the University in any matter pertaining to academics or research; presenting, as one's own, the ideas or words of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved.

A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in *The Student Code.*

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# Math 2620: Financial Mathematics I
# Schedule - Spring 2009

| ***Tuesday***<br>*2:00 – 3:15*<br>*MSB Rm. 303* | ***Thursday***<br>*2:00 – 3:15*<br>*MSB Rm. 303* |
|---|---|
| **1/20**<br>Intro. to Course / Unit 1: Introduction | **1/22**<br>Unit 2: Financial Markets |
| **1/27**<br>Unit 3: Cash Flows | **1/29**<br>Unit 4: Future Values |
| **2/3**<br>Unit 5: Present Values | **2/5**<br>**Test 1: Units 1 – 5** |
| **2/10**<br>Unit 6: Effective & Nominal Rates | **2/12**<br>Unit 7: Financial Assets |
| **2/17**<br>Unit 8: Measuring Financial Performance | **2/19**<br>Unit 9: Annuities |
| **2/24**<br>Review, Units 6-9 | **2/26**<br>**Test 2: Units 6 – 9** |
| **3/3**<br>Unit 10: Loans | **3/5**<br>Unit 10: Loans (cont.) |
| **Spring Break 3/7 – 3/15** | |
| **3/17**<br>Units 9 & 10: Annuities & Loans | **3/19**<br>Units 9 & 10: Annuities & Loans |
| **3/24**<br>Review, Units 9 & 10 | **3/26**<br>**Test 3: Units 9 & 10** |
| **3/31**<br>Unit 11: Bonds | **4/2**<br>Unit 11: Bonds (cont.) |
| **4/7**<br>Unit 11: Bonds (cont.) | **4/9**<br>Unit 12: Term Structure of Interest Rates |
| **4/14**<br>Unit 12: Term Structure (cont.) | **4/16**<br>Unit 12: Term Structure (cont.) |
| **4/21**<br>Review, Units 11 & 12 | **4/23**<br>**Test 4: Units 11 & 12** |
| **4/28**<br>Review for Final Exam | **4/30**<br>Review for Final Exam |
| **5/4 - 5/9: Final Exam Week**<br>**Math 2620 Final Exam Date & Time: To Be Announced** | |