

**Topics in Applied Mathematics: Actuarial Science
Spring 2013**

MATH 478.56 (3 credits), Tu 3:00P-3:50P, Th 5:00P-5:50P, Wickersham 219

Instructor: Dr. Buchanan

Office: Wickersham 217-1, Phone: 872-3659, FAX: 871-2320

Office Hours: 2:00PM-2:50PM (M–F), or by appointment

Email: Robert.Buchanan@millersville.edu

Textbook: *Mathematics of Investment and Credit*, 5th edition, Samuel A. Broverman, ACTEX Publications, Inc., Winsted, CT, 2010, ISBN: 978-1-56698-767-7.

Calculator: The Texas Instruments [BA II PLUS](#) calculator is approved for use on the actuarial exams. Students should practice solving problems using this calculator prior to taking the actuarial examination. Students may also use the Texas Instruments [BA II PLUS PROFESSIONAL](#) calculator.

Objectives: MATH 478.56 provides an introduction to the topics tested on the [Society of Actuaries Exam FM](#) and [Casualty Actuarial Society Exam 2](#). Upon completion of this course the student will understand:

- interest rates and the time value of money,
- annuities,
- loan repayment,
- bonds,
- yield rates of investments,
- term structure of interest rates,
- asset liability management, duration, and immunization,
- derivative securities,
- forwards, futures, call and put options,
- investment strategies,
- use of derivatives to manage risk,
- swaps, and
- currency forward contracts.

Course Contents: Topics covered in this course will include the following from the textbook.

- Interest Rate Measurement (Chap. 1)
- Valuation of Annuities (Chap. 2)
- Loan Repayment (Chap. 3)
- Bond Valuation (Chap. 4)
- Measuring the Rate of Return of an Investment (Chap. 5)

- The Term Structure of Interest Rates (Chap. 6)
- Cashflow Flow Duration and Immunization (Chap. 7)
- Forwards, Futures, Swaps, and Options (Chap. 9)

Hand written lecture notes and examples will be posted under Desire2Learn prior to discussing them in class. Students should read and study these notes before coming to class and bring any questions regarding the material with them to class.

If time permits other topics may be covered as well.

Attendance: Students are expected to attend all class meetings per the [University Approved Guidelines](#). If you know beforehand that you will be absent from class on the day an assignment is due, you must complete and hand in the assignment prior to the absence. If you are unexpectedly absent the day that an assignment is due you must hand in the assignment at the beginning of the class hour on the first day that you return to class. If you know you will be absent on the day of a test, you must notify me before the time the test is scheduled in order to schedule a make-up test. Students who miss a test should provide a valid excuse, otherwise you will not be allowed to make up the test. No final exam exemptions.

Homework: Students are expected to do their homework and participate in class. Students should expect to spend a minimum of three hours outside of class on homework and review for every hour spent in class. Homework exercises help students review and reinforce concepts covered in class. The textbook exercises are arranged in generally increasing level of difficulty. Working only the low-numbered exercises will not prepare a student sufficiently for the test and final examination exercises. All assigned homework exercises must be worked until successful completion.

Tests: There will be three 50-minute in-class tests and a final examination. Dates for the tests have not been set. The tests will be administered after each of the following topics are completed.

1. Interest rates, annuities, and loan repayment.
2. Bonds, yield rates of investments, term structure of interest rates, asset liability management, duration, and immunization.
3. Derivative securities, forwards, futures, call and put options, investment strategies, management of risk, swaps, and currency forward contracts.

The comprehensive final examination is scheduled for Friday, May 17, 2013 from 2:45PM–4:45PM. I will not “curve” test or exam grades.

Grades: Course grade will be calculated as follows.

Tests	75%
Exam	25%

Tests and the final examination will be graded individually on a 100-point scale. I keep a record of students’ test, homework, and exam scores. Students should also keep a record of graded assignments, tests, and other materials.

The course letter grade will be assigned as follows. I will not “curve” course grades.

90-92	A-	93-100	A		
80-82	B-	83-86	B	87-89	B+
70-72	C-	73-76	C	77-79	C+
60-62	D-	63-66	D	67-69	D+
		0-59	F		

Course Repeat Policy An undergraduate student may not take an undergraduate course of record more than three times. A course of record is defined as a course in which a student receives a grade of A, B, C, D, (including + and -) F, U, Z or W. The academic department offering a course may drop a student from a course if the student attempts to take a course more than three times.¹

The last day to withdraw from a course (and receive the W grade) is Friday, April 12, 2013.

Inclement Weather Policy: If we should miss a class day due to a school [delay](#) or [cancellation](#), any activities planned for that missed day will take place the next time the class meets. For example, if a test is scheduled for a day that class is canceled on account of snow, the test will be given the next time the class meets.

Final Word: Mathematics is not a spectator sport. What you learn from this course and your final grade depend mainly on the amount of work you put forth. Daily contact with the material through homework assignments and review of notes taken during lectures is extremely important. Organizing and conducting regular study sessions with other students in this class will help you to understand the material better.

No one can guarantee you success in this course. Your responsibilities and the instructor's expectation are outlined above. There will be no second chances, "do-overs", or extra credit assignments.

¹Memorandum to mathematics faculty from Dr. Charles G. Denlinger, Assistant Chair, Department of Mathematics, August 30, 2004.