

Topics in Applied Mathematics: Actuarial Science
Spring 2018
MATH 478.56A (3 credits), _W_ 6:00P-9:00P, Ware Center

Instructor: Dr. Buchanan

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Office Hours: 9:00A-9:50A (M-F), or by appointment

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Textbook: *Mathematics of Investment and Credit*, 6th edition, Samuel A. Broverman, ACTEX Publications, Inc., Winsted, CT, 2015, ISBN: 978-1625424853

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.

There are calculator emulator applications for iOS and Android devices which may be used in class; however, only the actual calculator may be used on the official [SOA](#) Exam FM.

Objectives: MATH 478.56A 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)

Since this course is intended to prepare students to pass SOA Exam FM, class meetings will be divided into part presentation of mathematical and financial topics (lecture) and part solving exercises similar to those students will face on SOA Exam FM (practice).

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. Each week students will receive a printed handout of homework exercises which must be completed and handed in at the beginning of the next class meeting for grading.

Tests: There will be a midterm and a final examination each of 120 minutes in length. The midterm will be given on Wednesday, March 7, 2018 and will cover all material seen to that point. The comprehensive final examination is scheduled for Wednesday, May 9, 2018 from 6:00P–9:00P. I will not “curve” test or exam grades. The format of the tests will mimic the format of SOA Exam FM.

Grades: Course grade will be calculated as follows.

Homework	50%
Midterm Examination	25%
Final Examination	25%

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 6, 2018.

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.

Cell Phones: Silence (or better yet, turn off) all cellular telephones upon entering the classroom. Leaving class to initiate or receive a telephone call will not be tolerated and students doing so will not be re-admitted to the classroom until the following class meeting. Texting or tweeting during class interferes with the learning process. Students distracted by their cell phones are not engaged in class and will find, over the course of the semester, that learning and course grade will suffer.

Title IX Reporting Responsibilities: Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, *et seq.*, and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report to the University's Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy incidents of sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred.

Information regarding the reporting of sexual violence, and the resources that are available to victims of sexual violence, is available at <http://www.millersville.edu/social/eq/title-ix-sexual-misconduct/index.php>.

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.