COURSE: Financial Mathematics for Actuaries
TuTh 2:30pm-3:45pm in Janet & Walter Sondheim Building #101

PROFESSOR: Hye-Won Kang
Office: Math/Psych Building #424
Email: hwkang@umbc.edu
Office Hours: Tuesday and Thursday during 11:00am-12:00pm, or by appointment.
I will try to respond to all emails on the same day. However during the weekends, I am not available to answer them.

GRADER: NA

TEXT: Financial Mathematics: A Practical Guide for Actuaries and other Business Professionals, by Ruckman and Francis; Second Edition, BPP Professional Education. Textbook is required.

COURSE DESCRIPTION:
This course is an introduction to the mathematics of interest and the evaluation of interest related products including annuities with non-contingent payments, loans, bonds, general cash flows, and portfolios. Additional topics discussed include financial instruments such as shorts, swaps, and options. We will cover most of Chapters 1, 2, 3, 4, 5, and 6 of the textbook.

PREREQUISITE:
You must have completed MATH 152 with a grade of "C" or better.

GRADING POLICY:
Grades are based on homework, two midterm exams, a final exam, and a final group project (project report and presentation). Your two lowest homework scores will be dropped. Final letter grade is decided based on the total grade as follows:

Letter Grade	**Total Scores**
A	$90 \leq \text{Total} \leq 100$
B	$80 \leq \text{Total} < 90$
C	$70 \leq \text{Total} < 80$
D	$60 \leq \text{Total} < 70$
F	$\text{Total} < 60$

However, factors such as overall distributions of grades or consistency in homework and midterm exams will affect on the final letter grade. Contributed portions of the total score are as follows:

	HOMEWORK	**MIDTERM EXAMS**	**FINAL EXAM**	**FINAL PROJECT**	**TOTAL**
Percentage	20%	40%	20%	20%	100%

HOMEWORK:

There will be weekly assignments and it is due every Thursday. You are required to turn in your homework to me before the class, which are assigned in the materials learned on Tuesday and Thursday a week before. All problems in every homework will be graded. You are encouraged to discuss together but copying from other students is NOT allowed. Also, copying from a solution manual is PROHIBITED. Any violation will result in ZERO grade and will be reported to the University Academic Integrity Committee. Your two lowest homework scores will be dropped. Late homework or submission by email will NOT be accepted.

MIDTERM EXAM:

Two midterm exams will be taken in class (February 28 and April 9). Chapters for the midterm are given in the schedule of the course. You are NOT allowed to bring any cheat sheet and you are allowed to bring a scientific calculator during the exam. Graphical calculators are PROHIBITED.

FINAL EXAM AND PROJECT:

All Math 365 students are required to take a final exam covering the topics listed on this syllabus and a final project. The final exam will be taken during 1:00pm-3:00pm on May 16 and the final group project report is due by May 19. The final group project report should be submitted ELECTRONICALLY ONLY. You can write the project by hand or type them using MS Word or other software. In case you write them by hand, they should be LEGIBLE.

SCHEDULE OF EXAMS:

Exam 1: February 28, 2019 during the lecture
Exam 2: April 9, 2019 during the lecture
Project Presentation: May 2-9, 2019 during the lecture
Final Exam: May 16, 2019 1:00pm-3:00pm in the lecture room
Project Report: All material should be submitted electronically due by May 19, 2019.

MAKE UP EXAM AND MISSED EXAM POLICY:

In very emergency case only, you can ask for a make-up exam. You must notice to the instructor at least 10 days before the original exam date. Make-up exams will be taken before the original exam date (for midterm). In case, you do not notice for a make-up exam and missed it, there will be no make-up exam AT ANY CASE. If you miss one of the midterm exam, final exam, or final project, I do not think you can pass the course.

ATTENDANCE:

The attendance is not mandatory except for project preparation and presentation days, but is highly recommended. Based on the previous experience, students who attend every lecture have a very higher tendency to get a higher score at the end. When you come to the class, you are expected to participate in the class. I ask that you bring a textbook, you are on time, and pay attention to the class. No excuse for being habitually late and the use of smartphones during class is strongly discouraged. Please do not distract yourselves and other students.

CALCULATOR:

During exams, you can only use a scientific calculator. You need to explain every part based on the mathematical reasoning.

INCOMPLETE:

If you do complete the course successfully except for a very small portion or a final exam due to very extraordinary and emergence situation (such as to stop attending school for the rest of the semester due to injury in an accident), you will be considered to get Incomplete. You are required to submit a written statement and evidence describing reason to get Incomplete. If the reason to get Incomplete is because you are behind in the course, I would recommend to drop the course, instead.

GETTING HELP:

There are lots of places you can get help. Tutoring is available through the Learning Resources Center (https://lrc.umbc.edu) and for athletes, the Athletic Department.

ACADEMIC INTEGRITY:

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of disciplinary action that may include, but is not limited to, suspension or dismissal. See the Faculty Handbook, or the UMBC Policies section of the UMBC directory (https://aetp.umbc.edu/ai/).

APPROXIMATE COURSE SCHEDULE:

This course will cover various topics. The below is the approximate schedule of the course which is subject to change. The changed schedule will be updated regularly on the course web page in Blackboard.

	DATES	**SECTIONS**	**TOPICS**
1	Tu Jan 29		No class due to campus closure
	Th Jan 31	1.1-1.4	Simple/ Compound interest, Accumulated value
2	Tu Feb 5	1.5-1.7	Present value, Rate of discount, Constant force of interest
	Th Feb 7	1.8-1.9, 2.1	Varying force of interest, Discrete changes in interest rates, Annuity-immediate
		HW1 due	From Sections 1.1-1.4
Friday, February 8, is the last day to withdraw from the course <u>without</u> receiving a 'W' on your transcript.			
3	Tu Feb 12	2.2-2.4	Annuity-due, Deferred annuities, Continuously payable annuities
	Th Feb 14	2.5-2.6, 3.1	Perpetuities, Equations of value, Increasing annuity-immediate
		HW2 due	From Sections 1.5-1.9 and 2.1
4	Tu Feb 19	3.1-3.3	Increasing annuity-immediate, Increasing annuity-due, Decreasing annuity-immediate
	Th Feb 21	3.4-3.6	Decreasing annuity-due, Continuously payable varying annuities, Compound increasing annuities
		HW3 due	From Section 2.2-2.6 and 3.1

5	Tu Feb 26	**Review 1**	**Review for Exam 1**
	Th Feb 28	**EXAM 1**	**Chapters 1 and 2**
6	Tu Mar 5	3.7-3.9	Continuously varying payment streams, Continuously increasing/ decreasing annuities
	Th Mar 7	4.1-4.3	Non-annual interest and discount rates, Nominal $p$thly interest/ discount rates
7	Tu Mar 12	4.4-4.5	Annuities-immediate payable $p$thly, Annuities-due payable $p$thly
		HW4 due	From Section 3.1-3.7
	Th Mar 14	Project	Discuss possible project topics
8	Tu Mar 19	Spring Break	No class
	Th Mar 21	Spring Break	No class
9	Tu Mar 26	4.6-4.7	Increasing $p$thly annuities, Pthly increasing $p$thly annuities
	Th Mar 28	5.1-5.2	Discounted cash flow analysis, Nominal vs. real interest rates
		HW5 due	From Sections 4.1-4.5
10	Tu Apr 2	5.3-5.4	Investment funds, Allocating investment income
	Th Apr 4	**Review 2**	**Review for Exam 2**
		HW6 due	From Sections 4.6-4.7 and 5.1-5.2
Monday, April 8, is the last day to withdraw from the course <u>with</u> receiving a 'W' on your transcript.			
11	Tu Apr 9	**EXAM 2**	**Chapters 3 and 4**
	Th Apr 11	5.5-5.6	Loans: the amortization method, Loans: the sinking fund method
12	Tu Apr 16	5.5-5.6	Review some problems
	Th Apr 18	6.1	Types of financial instruments
		HW7 due	From Sections 5.3-5.6
13	Tu Apr 23	6.1	Types of financial instruments
	Th Apr 25	Project	**Project Preparation (Group meeting)**
14	Tu Apr 30	Project	**Project Preparation (Group meeting)**
		HW8 due	From videos linked
	Th May 2	Project	Project Presentation
15	Tu May 7	Project	Project Presentation
	Th May 9	Project	Project Presentation
16	Tu May 14	**Review 3**	**Review for Final Exam**
	Th May 16	**Final Exam**	**Chapters 4 and 5, Chapter 6.1**
17	**Sun May 19**	**Final Project**	**Final project report due date, submit electronic copy only by email**