STAT 451/BEPP 451/STAT 851/BEPP 851
Fundamentals of Actuarial Science I
Fall 2016

Textbooks:	S. Broverman: Mathematics of Investment and Credit (Bookstore) Dickson, Hardy, Waters: Actuarial Mathematics for Life Contingent Risks (Bookstore)	
Course Pack:	www.study.net. Password: INSR2010	
Office hours:	Tuesdays, 4:30-5:45; Thursdays 12:30 – 1:30; and by appointment (lemaire@wharton.upenn.edu) JMHH 458	
Note:	If you hit "**Reply**" on an e-mail from me to the class, you are replying to the whole class.	
Homework:	Homework problems, to be found in the course pack, are to be turned in four times during the course.	
Lesson 1: 8/30	Introduction to the actuarial science program	
Lesson 2: 9/1	The measurement of interest: interest accumulation and effective interest rates. Present value and equation of value	BR 1.1-1.2
Lesson 3: 9/6	Nominal rates of interest. Effective and nominal rates of discount	BR 1.3-1.4
Lesson 4: 9/8	The force of interest. Inflation	BR 1.5-1.6
Lesson 5: 9/13	Level payment annuities	BR 2.1
Lesson 6: 9/15	Some generalizations	BR 2.2
Lesson 7: 9/20	Annuities with non-constant payments	BR 2.3
Lesson 8: 9/22	Loan repayment: Amortization method **Homework due: K1-1, K1-3, K1-11, K1-12 K3-3, K3-11, K3-15, K3-20**	BR 3.1-3.2

Lesson 9: 9/27	Truth in Lending	
Lesson 10: 9/29	The Sinking Fund method. Applications	BR 3.3
Lesson 11: 10/4	Applications **End of mid-term material**	BR 3.4
Lesson 12: 10/11	Bonds pricing	BR 4.1
Lesson 13: 10/13	Bond amortization. Callable bonds **Homework due: K5-2, K6-1, K6-5, K6-6**	BR 4.2 – 4.3.1
Lesson 14: 10/18	**Mid-term exam**	
Lesson 15: 10/20	Internal rate of return Dollar-weighted and time weighted rate of return Suggested reading:	BR 2.4.1, 5.1 BR 5.1.3, 5.3.1
Lesson 16: 10/25	Spot rates, forward rates, duration	BR 6.1, 6.3, 7.1
Lesson 17: 10/27	Duration, Immunization	BR 7.2
Lesson 18: 11/1	Survival Models	D2
Lesson 19: 11/3	Survival models	D2
Lesson 20: 11/8	Life tables	D3
Lesson 21: 11/10	Assumptions for fractional ages	D3
Lesson 22: 11/15	Select tables	D3

Lesson 23: 11/17	Whole life insurance **Homework due: B3-1-3, B3-1-4, B3-3-6, B3-4-3** **Check remark below about the use of tables**	D4
Lesson 24: 11/22	Whole life insurance	D4
Lesson 25: 11/29	Term insurance.	D4
Lesson 26 12/1	Other life insurance policies	D4
Lesson 27 12/6	Other life insurance policies **Homework due: B4-2, B4-3, B4-6, B4-10**	D4
Lesson 28 12/8	Application: Guns and life expectancies The paper is in the course pack under "Journal of Risk and Insurance"	

Final Exam: Thursday December 22, 12:00 – 2:00

Homework is individual work. Homework questions are found in the course pack (not textbook exercises). You are not to discuss homework with other students. Some homework questions require the use of an Illustrative Life Table. Two such tables are provided in the course pack: an "old" table (i=5%), for all problems that begin with the letter B, and a "new" table (i=6%), for problems downloaded from the Society of Actuaries' web site.

You need to bring a calculator (SoA or equivalent) to the mid-term and final exam. You are not expected to know financial functions on the calculator. You may bring your class notes, the textbooks, and a few pages of hand-written formulas. The final is non-cumulative. Final grade: 20% homework, 40% mid-term, 40% final

The material for the mid-term and the final exam is the material taught in class, not the material of SoA exams. Material covered in class that is not part of SoA exam FM consists of Truth-in-Lending and applications.

Answers to course pack questions dated 2000 and later can be found in the SoA website: www.soa.org (click: Education, Exams and Requirements, ASA, exam FM or MLC, Past Exam Questions and Solutions; find the exam session and click solutions). A grid with answers to earlier questions is in the course pack. A sample mid-term and a sample final are in the course pack under the title "sample mid-term".