STAT 451/BEPP 451/STAT 851/BEPP 851
Fundamentals of Actuarial Science I
Fall 2013

Textbooks: S. Broverman: Mathematics of Investment and Credit (Bookstore)
Dickson, Hardy, Waters: Actuarial Mathematics for Life Contingent Risks (Bookstore)

Additional notes: Free download from

http://www.cambridge.org/gb/knowledge/isbn/item2703201/?site_locale=en_GB&display=genresources&anchor=true

Course Pack: www.study.net. Password: INSR2010

Office hours: Tuesdays, Thursdays 12:30-1:30, Tuesdays 4:30-5:30, 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: 8/29	Introduction to the actuarial science program	
Lesson 2: 9/3	The measurement of interest: interest accumulation and effective interest rates. Present value and equation of value	BR 1.1-1.2
Lesson 3: 9/5	Nominal rates of interest. Effective and nominal rates of discount	BR 1.3-1.4
Lesson 4: 9/10	The force of interest. Inflation	BR 1.5-1.6
Lesson 5: 9/12	Level payment annuities	BR 2.1
Lesson 6: 9/17	Some generalizations	BR 2.2

Lesson 7: 9/19	Annuities with non-constant payments	BR 2.3
Lesson 8: 9/24	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: 9/26	No class	
Lesson 10: 10/1	Truth in Lending	
Lesson 11: 10/3	The Sinking Fund method. Applications	BR 3.3
Lesson 12: 10/8	Applications **End of mid-term material**	BR 3.4
Lesson 13: 10/15	Bonds pricing	BR 4.1
Lesson 14: 10/17	Bond amortization. Callable bonds **Homework due: K5-2, K6-1, K6-5, K6-6**	BR 4.2 – 4.3.1
Lesson 15: 10/22	**Mid-term exam**	
Lesson 16: 10/24	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 17: 10/29	Spot rates, forward rates, duration	BR 6.1, 6.3, 7.1
Lesson 18: 10/31	Duration, Immunization	BR 7.2
Lesson 19: 11/5	Survival Models	D2
Lesson 20: 11/7	Survival models	D2
Lesson 21: 11/12	Life tables	D3

Lesson 22: 11/14	Assumptions for fractional ages	D3
Lesson 23: 11/19	Select tables **Homework due: B3-1-3, B3-1-4, B3-3-6, B3-4-3** **Check remark below about the use of tables**	D3
Lesson 24: 11/21	Whole life insurance	D4
Lesson 25: 11/26	Term insurance.	D4
Lesson 26 12/3	Other life insurance policies **Homework due: B4-2, B4-3, B4-6, B4-10**	D4
Lesson 27 12/5	Open	

Final Exam: December 20, 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. A grid with answers to earlier questions is in the course pack.