



STAT 451/BEPP 451/STAT 851/BEPP 851
Fundamentals of Actuarial Science I
Fall 2014

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, Thursdays 4:30-6:30, 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: Introduction to the actuarial science program
8/28

Lesson 2: The measurement of interest: interest accumulation and
9/2 effective interest rates. Present value and equation of value BR 1.1-1.2

Lesson 3: Nominal rates of interest. Effective and nominal rates
9/4 of discount BR 1.3-1.4

Lesson 4: No class
9/9

Lesson 5: No class
9/11

Lesson 6: The force of interest. Inflation BR 1.5-1.6
9/16

Lesson 7: Level payment annuities BR 2.1
9/18

Lesson 8: Some generalizations BR 2.2
9/23

Lesson 9: 9/25	Annuities with non-constant payments	BR 2.3
Lesson 10: 9/30	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 11: 10/2	Amortization method	BR 3.2
Lesson 12: 10/7	Truth in Lending	
Lesson 13: 10/14	The Sinking Fund method. Applications	BR 3.3
Lesson 14: 10/16	Applications End of mid-term material	BR 3.4
Lesson 15: 10/21	Bonds pricing	BR 4.1
Lesson 16: 10/23	Bond amortization. Callable bonds Homework due: K5-2, K6-1, K6-5, K6-6	BR 4.2 – 4.3.1
Lesson 17: 10/28	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 18: 10/30	Spot rates, forward rates, duration	BR 6.1, 6.3, 7.1
10/30 or 11/4 6:00 – 7:30	(your choice) Mid-term exam	
Lesson 19: 11/4	Duration	BR 7.2
Lesson 20: 11/6	Immunization	BR 7.2
Lesson 21: 11/11	Survival models	D2

Lesson 22: 11/13	Survival models	D2
Lesson 23: 11/18	Life tables	D3
Lesson 24: 11/20	Assumptions for fractional ages	D3
Lesson 25: 11/25	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 26 12/2	Whole life insurance	D4
Lesson 27 12/4	Term insurance.	D4
Lesson 28 12/9	Other life insurance policies Homework due: B4-2, B4-3, B4-6, B4-10	D4

Final Exam: December 17, 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.