

INSR 251/STAT 451
INSR 829/STA 851
Fundamentals of Actuarial Science
Prof. J. Lemaire
Fall 2011

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

Course Pack: www.study.net.

Office hours: Tuesdays, Thursdays 12:30-1:30, Tuesdays 4:30-5:30, and by
appointment (lemaire@wharton.upenn.edu) SH-DH 3404

Note: This is the first year of the Dickson textbook. The syllabus is tentative,
as of lesson 18. I may cover more, or less.

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.

Review classes: Optional review classes, every other Monday, 4:30 – 6:00, SH-DH
1203, taught by Jialun Li (jialunli@wharton.upenn.edu)

Lesson 1: Introduction to the actuarial science program
9/8

Lesson 2: The measurement of interest: interest accumulation and
9/13 effective interest rates. Present value and equation of value BR 1.1-1.2

Lesson 3: Nominal rates of interest. Effective and nominal rates
9/15 of discount BR 1.3-1.4

Lesson 4: The force of interest. Inflation BR 1.5-1.6
9/20

Lesson 5: Level payment annuities BR 2.1
9/22

Lesson 6: 9/27	Some generalizations	BR 2.2
Lesson 7: 9/29	Annuities with non-constant payments	BR 2.3
Lesson 8: 10/4	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: 10/6	Truth in Lending	
Lesson 10: 10/13	The Sinking Fund method. Applications	BR 3.3
Lesson 11: 10/18	Applications End of mid-term material	BR 3.4
Lesson 12: 10/20	Bonds pricing	BR 4.1
Lesson 13: 10/25	Bond amortization. Callable bonds Homework due: K5-2, K6-1, K6-5, K6-6	BR 4.2 – 4.3.1
Lesson 14: 10/27	Mid-term exam	
Lesson 15: 11/1	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: 11/3	Spot rates, forward rates, duration	BR 6.1, 6.3, 7.1
Lesson 17: 11/8	Duration, Immunization	BR 7.2
Lesson 18: 11/10	Dickson chapter 2	
Lesson 19: 11/15	Dickson chapter 2	
Lesson 20:	Dickson chapter 3	

11/17 Dickson chapter 3

Lesson 21: Dickson chapter 3
11/22

Lesson 22: Dickson chapter 3
11/29

Lesson 23: Dickson chapter 4
12/1 **Homework due: B3-1-4, B3-2-2, B3-3-6, B3-4-3**
 Check remark below about the use of tables

Lesson 24: Dickson chapter 4
12/6

Lesson 25: Dickson chapter 4
12/8 **Homework due: B4-2, B4-3, B4-6, B4-10**

Final Exam: tentatively Monday 12/19, 12:00

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 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. Much more than 95% of the SoA material for exams FM and MLC is covered in INSR classes. For the compound interest part, material covered in class that is not part of SoA exam FM consists of Truth-in-Lending and applications. Consequently, these parts are included in the INSR 251 mid-term.

Answers to course pack questions dated 2000 and later can be found in the SoA website: www.soa.org (click on Education, Exams and Requirements, Associate of the Society of Actuaries, Exam FM or MLC, Past Exam Questions and Solutions). A grid with answers to earlier questions is in the course pack.

All students enrolled in courses in the Business and Public Policy Department (including Insurance and Risk courses) is expected to comply with the University of Pennsylvania's Code of Academic Integrity. We encourage all students to read the University's Code so that they are well aware of all situations that would be considered a violation thereof.

It is the policy of the Department of Business and Public Policy to immediately fail any student who is to be in violation of the University of Pennsylvania's Code of Academic Integrity. Cheating, in any manner, on a graded assignment or exam will result in failing both the assignment/exam and the course. In addition to the sanctions imposed by the Department of Business and Public Policy, the Office of Student Conduct may impose additional sanctions.

Please review the Code of Academic Integrity on the below link as well as example of violations and possible sanctions:

http://www.upenn.edu/provost/PennBook/academic_integrity_code_of