

## Mathematics 3050: Fall 2018

Instructor: Lawrence Smolinsky  
382 Lockett Hall  
Telephone: 578-1570  
E-mail: smolinsk@math.lsu.edu  
Office hours: \*\*\*

TA: To be determined

**MATH 3050 Interest Theory** (5) Prereq.: MATH 1552. Measurement of interest (including accumulated and present value factors), annuities certain, yield rates, amortization schedules and sinking funds, bonds and related securities, interest rate swaps, and determinants of interest rates.

### **Class information.**

Classroom: \*\*\*\* Lockett Hall  
Meeting time: Monday through Friday from \*\*\*\*.

**Work expectations.** Math 3050 is a 5 credit hour class. Students are expected to spend *a minimum* of 15 hours per week on attending class, reading material, completing homework, and preparing for tests.

**Introduction.** Math 3050 will cover the material for the actuarial exam Exam FM/2. Students who do not wish to take these exams are welcome to take MATH 3050, but they will have to follow the same requirements as students planning to take the exam. This includes purchasing one of a few specific calculators for this course: BA-35, BA II Plus, or BA II Plus Professional Edition. You should pick a calculator that you plan to use on Exam FM/Exam 2. They all should be able to do any financial calculation required. The more sophisticated BA II Plus or BA II Plus Professional may take less steps, however they will take you more time to learn. Also allowed are TI-30X, TI-30Xa, TI-30Xs, or TI-30X II; but these are scientific calculators and do not include annuity functions. Many people use a BA series and a scientific calculator. You may use both. You must have a calculator prior to the first test.

### **Text.**

- Francis, J. and Ruckman, C., *Interest Theory—Financial Mathematics and Deterministic Valuation*, 2016, ActuarialBrew

The following study notes which may be downloaded for free from the Society of Actuaries at <https://www.soa.org/education/exam-req/edu-exam-fm-detail.aspx> under *syllabus and study materials*.

- FM-24-17 Using Duration and Convexity to Approximate Change in Present Value. Sections 1-4 are required reading.
- FM-25-17 Interest Rate Swaps. The entire note is required reading.
- FM-26-17 Determinants of Interest Rates. The entire note is required reading.

**Topics.** The topics covered will be in the textbook chapters 1-16 (excluding 12.04 and 13.04) and the study notes.

Week	Topics
1	Time value of money: Interest, discount, force of interest
2	Annuities: increasing/decreasing, geometric, continuous
3	Loans
4	Amortization, sinking funds
5	Bonds
6	Amortization of premium, accumulation of discount
7	Cash Flows and Portfolios
8	Dollar-weighted and time-weighted rate of return, dividend discount model
9	Duration (Macaulay and modified), convexity (Macaulay and modified)
10	Convexity (Macaulay and modified)
11	Immunitization full immunization and Redington
12	Interest rate swaps
13	Determinants of interest rates
14	SOA exam preparation

### Grade computation.

Item	Provisional Date	Grade contribution
Test 1	Tuesday September ***	15%
Test 2	Thursday October ***	15%
Test 3	Friday October ***	15%
Test 4	Friday November ***	15%
Final Exam	*** December *** at ***	20%
Homework	Various dates	20%

During any test or exam you may not use any electronic device other than a *Society of Actuaries* approved calculator. Cell phones must be shut off—not just on silent mode—and put away while you are in the exam room on an exam day. Smart watches should not be accessible.

Homework assignments will usually be weekly. They will be collected and graded.

Homework assignments and other information will be posted at:

[https://www.math.lsu.edu/~smolinsk/Interest Theory/Interest.html](https://www.math.lsu.edu/~smolinsk/Interest%20Theory/Interest.html)

**Grade scale.**

Grade	Range
A+	97%-100%
A	94%-96.9%
A-	90%-93.9%
B+	87%-89.9%
B	84%-86.9%
B-	80%-83.9%
C+	77%-79.9%
C	74%-76.9%
C-	70%-73.9%
D+	67%-69.9%
D	64%-66.9%
D-	60%-63.9%
F	59.9% and below%

**Disability statement.** The University is committed to making reasonable efforts to assist individuals with disabilities in their efforts to avail themselves of services and programs offered by the University. To this end, Louisiana State University will provide reasonable accommodations for persons with documented qualifying disabilities. If you have a disability and feel you need accommodations in this course, you must present a letter to me from Disability Services in 115 Johnston Hall, indicating the existence of a disability and the suggested accommodations.