Salisbury University Department of Mathematical Sciences

MATH 215 : Introduction to Financial Mathematics
Syllabus (Tentative)

Description: Introduction to basic financial mathematics focusing on equivalent rates of interest and their use in discounted cash flow analysis. Topics include interest models, time value of money (TVM), annuities, loans, bonds, and the yield curve. Duration convexity, and portfolio management along with relevant topics will be studied. 4 Hours Credit: Meets four hours per week. Meets General Education IVB or IVC.

Prerequisites: C or better in MATH 160 or equivalent.

Intended Audience: Math majors electing the actuarial science track and others interested in the application of mathematics to finance.

Objective: To provide an understanding of the fundamental concepts of financial mathematics, and how those concepts are applied in calculating present and accumulated values for various streams of cash flows for use in: amortizing loans, pricing financial instruments, valuing assets and liabilities, and personal finance.

Textbooks: *Membership at www.coachingactuaries.com will provide students with course notes, online homework system and extensive practice for professional exam in financial mathematics.*

Financial Mathematics for Actuaries, by Chan, Wai-Sum, and Tse, Yiu-Kuen, Second Edition, 2018, World Scientific Publishing Company, ISBN: 978-9813224674

Technology: Excel, VBA, and the BAII Plus calculator will be used throughout the class.

Topic	Weeks
Interest rates, time value of money, and annuities	4
Definition of the accumulation function; nominal and annual rates of interest and discount; discounting and accumulating a single payment or a series of payments; present and accumulated values of level annuities; non-level annuities.	
Applications of cash flow valuation: loans and bonds	2
Net present value and applications; amortizing of loans; the sinking fund approach; pricing bonds.	
Term structure and determinants of interest rates	1.5
Definition of the internal rate of return; time-weighted and dollar-weighted rate of return; net present value; yield curve; spot rates; forward rates; yield to maturity; cash flow valuation; determinants of interest rate.	
Asset-liability management	1.5
Matching asset and liability cash flows; durations; convexity; approximations using duration and convexity; duration of portfolios; immunization; stocks and other investments.	
Interest Rate Swaps	1
Introduction of derivative securities; interest rate swaps; terminology and examples; calculation of swap rate; market value of a swap.	
Excel + VBA + BAII Plus calculator	3
Tests	1
Total	**14**

Evaluation

Quizzes and Projects (Excel)	30 – 40%
Online Homework	15 – 20%
Tests	30 – 45%
Final	25 – 40%

- Free tutoring is available for this course in the Spring and Fall semesters.
- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.
- **Writing Across the Curriculum:** Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing. At the University Writing Center, trained consultants are ready to help you at any stage of the writing process. In addition to the important writing instruction that occurs in the classroom and during professors' office hours, the Center offers another site for learning about writing. **All students are encouraged to make use of these important services.**
- **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.