

STANDARD COURSE SYLLABUS FORMAT

COURSE NUMBER: MAT 586

COURSE TITLE: Financial Mathematics for Actuaries

CREDITS: 3:3

PREREQUISITES / COREQUISITES: A grade of C or above in MAT 394, or consent of instructor

FOR WHOM PLANNED:

This course is required for students majoring in MA in Mathematics with concentration on Actuarial Mathematics. It is also intended to be an elective course for students majoring in BS/BA in Mathematics.

INSTRUCTOR INFORMATION:

Haimeng Zhang, TR 9:30 – 11:00am, 334-5836, h_zhang5@uncg.edu

BULLETIN DESCRIPTION:

Measurement of interest, present and accumulated value, amortization, sinking funds, bonds, duration, immunization, and an introductory analysis of financial derivatives. Geared toward the FM/2 actuarial exam.

STUDENT LEARNING OUTCOMES:

After completing this course, undergraduate students should be able to

SLO1: acquire a firm understanding of the fundamental concepts and theories of financial mathematics.

SLO2: demonstrate effectively how these concepts and theories are applied in solving the actuarial problems.

SLO3: develop the problem-solving strategies and reasoning that help prepare for the actuarial FM/2 exam;

For graduate students, they should be able to

SLO1: acquire a firm understanding of the fundamental concepts and theories of financial mathematics.

SLO2: demonstrate effectively how these concepts and theories are applied in solving the actuarial problems.

SLO3: develop the problem-solving strategies and reasoning that help prepare for the actuarial FM/2 exam;

SLO4: derive the fundamental theories and properties in financial mathematics.

TEACHING METHODS AND ASSIGNMENTS FOR ACHIEVING LEARNING OUTCOMES:

This will be a lecture course with homework assignments and exams administrated throughout the semester.

EVALUATION AND GRADING:

Abstract reasoning and real world problem-solving strategies from actuarial area will be emphasized throughout the course. Students, through regular attention to lessons and reinforcing homework assignments, will be developing their problem-solving strategies and a firm understanding of fundamental concepts and theories of financial mathematics (SLO1). Weekly quizzes along with major exams will be used to evaluate the effectiveness of the understanding and problem-solving strategies. Student will demonstrate achievement of learning outcomes through satisfactory completion of graded homework assignments, quizzes, and exams. All the questions on homework assignments and tests are designed to evaluate each specific part in learning outcomes so that the grade reflects the attainment of the learning outcomes (SLO2 and SLO3). In addition, graduate students will be assigned additional homework, quiz, and exam problems for which they will be required to derive basic theories and properties in financial mathematics to further their understanding of the materials (SLO4).

Two Midterms	=	30%
Regular Homework	=	20%
Weekly Quizzes	=	25%
Final Exam	=	<u>25%</u>
Total		100%

The course grade will be determined by the following scale:

Undergraduates

97 – 100	A+
93 – 96	A
90 – 92	A-
86 – 89	B+
83 – 85	B
80 – 82	B-
76 – 79	C+
73 – 75	C
70 – 72	C-
66 – 69	D+
63 – 65	D
60 – 62	D-
Below 60	F

Graduates

93 – 100	A
90 – 92	A-
86 – 89	B+
82 – 85	B
78 – 81	B-
74 – 77	C+
70 – 73	C
Below 70	F

REQUIRED TEXTS/READINGS/REFERENCES

Ruckman, C.; and Francis, J., *Financial Mathematics: A Practical Guide for Actuaries and other Business Professionals* (Second Edition), 2005, BPP Professional Education (RF), including the course sessions on derivatives.

TOPICAL OUTLINE/CALENDAR:

Week 1	Interest rates and factors	RF, Chapter 1.
Weeks 2-3	Level annuities	RF, Chapter 2.
Weeks 4-5	Varying annuities	RF, Chapter 3.
Week 6	Non-annual interest rates and annuities	RF, Chapter 4, 4.1-4.7
Week 7	Financial instruments	RF, Chapter 6, 6.1-6.3
Week 8	Project appraisal and loans	RF, Chapter 5.
Week 9	Duration, convexity and immunization	RF, Chapter 7, 7.1-7.5
Week 10	The term structure of interest rates	RF, Chapter 8, 8.1 – 8.3
Weeks 11-12	Intro to derivatives, forwards, and options	RF, Course sessions 9-11
Weeks 13-14	Risk management, forwards and futures, swaps	RF, Course sessions 12-14

ACADEMIC INTEGRITY POLICY:

All students are expected to abide by the UNCG Honor Code at all times. Each student is required to sign the Academic Integrity Policy on all major work submitted for the course.

ATTENDANCE POLICY:

Students are expected to attend all classes.

FINAL EXAMINATION: A final exam is required for this course. The final exam will be cumulative. (The date of final exam will be specified here.)

ADDITIONAL REQUIREMENTS: Students are required to turn in homework assignments on time. Homework assignments more than one week late will not be accepted. Makeup exams will only be given in the case of extraordinary circumstances or an approved UNCG activity.