Mathematical Methods in Financial Economics  
Math 40570 & 50570 and Fin 40820 & 70820  
MWF 9:35-10:25, Room 140 DeBartolo Hall Spring 2013

Instructor: Thomas Cosimano, Department of Finance, Mendoza 236, Phone: 631-5178, Email: cosimano.1@nd.edu.  Office Hours: MW 10:45-12:00 and by appointment.

Description: This interdisciplinary course is designed to foster interaction between finance and mathematics at Notre Dame. For each unit of the course the mathematical components of the financial problem as well as the problem itself will be addressed. The following topics in financial economics will be included in the course: Arbitrage pricing of financial assets, pricing of stock options, risk assessment, portfolio decisions and risk management, and equilibrium pricing of financial assets. These topics will be addressed in continuous and discrete time. The necessary mathematical background from differential equations and probability theory will be provided. Students will work in interdisciplinary groups to develop final projects which use quantitative methods to address current issues in financial economics such as what risk management techniques led to the sub-prime lending crisis.

Course material: Lectures Notes for this course will be available to the students.

Reference Books: It is recommended that you buy one of the following books for additional readings.


Goals: Upon completion of this course students should have learned the basic mathematical ideas and techniques that are useful in formulating and solving problems arising in the financing of corporations. Moreover it will enhance problem solving skills, critical thinking, rational decision making and appreciation for the interaction between the disciplines of mathematics and finance. Furthermore students will be exposed to research in this interdisciplinary area. They are expected to develop a final project, which illustrates their understanding of some model of financial mathematics.

Electronic Course Information: Most information for this course (homework assignments, lectures, etc.) will be posted on the web at: http://www.nd.edu/~mmfe

Exam, Homework, Projects and their Grading:

| Midterm Exam | March 6  | Wednesday | 9:30-10:30 AM | DBartolo 140 | 100 |
| Final Exam   | May      | Scheduled | Time         | TBA           | 100 |
| Homework     |          |          | collected regularly |             | 100 |
| Projects     |          |          | including class participation (20 pts) |             | 100 |

Total points: 400
Your final grade will be assigned on the basis of your total score out of 400.

**Missed Exams:** A student who misses an examination will receive zero points for that exam unless he or she has a valid excuse (illness, excused athletic absence, etc.). Please see me ASAP (preferably before the exam) and a makeup exam will be scheduled.

**Exam Conflicts:** Students with more than 2 finals in one day, or more than 3 finals in a 24 hour period, may negotiate to change the time of one of these finals.

**Honor Code:** Examinations, homework and projects are conducted under the honor code. While collaboration in small groups in doing homework and projects is permitted (and strongly encouraged) in this course, copying is not. Exams are closed book and are to be done completely by yourself with no help from others.

**Homework:** Homework problems will be assigned and collected regularly. You are encouraged to work on homework problems in groups, but the assignments must be turned in individually. Remember that you will not learn anything by simply copying another student’s work. The main purpose of the homework is to help you learn the material.

**Project:** Students working in groups of diverse backgrounds will develop a final project, which illustrates the interaction between Mathematics, Finance and related fields. These projects will integrate financial and mathematical aspects of an asset pricing or financial engineering problem. Each student will have the opportunity to contribute her/his expertise and learn from the expertise of the other group members. For example a mathematics major would provide a derivation and possible solution of the model for the financial asset. A computer science major could develop a computer algorithm to solve a model of the financial asset. While a finance major or MBA student would develop the relation between the institutional details of the financial asset and the mathematical model being used to represent the financial asset. Each group will present its project to the whole class, thus providing additional opportunities for learning and inter-group interaction.

The rules are:

(a) You can work in groups of size 4-7 students.
(b) Each group should include Math and Finance majors.
(c) Each group submits one (typed) paper (and an e-copy if possible).
(d) Each member of the group receives the same score—a number between 0 and 80.
(e) Each member of the group must make a significant contribution to the project and should be able to understand and present the project as a whole.

**Class Attendance and Participation:** You are expected to attend all classes. Also, you are encouraged to actively participate by answering and asking questions. Please do your best to show up on time and quietly enter the room when this is not possible. Please remember to respect your colleagues who are here to learn.

**Calculators:** You may use a graphing calculator during exams.