

MFIN704
Numerical Methods
Winter 2018 Course Outline

Finance and Business Economics
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

This course will introduce students to common numerical methods and their applications in finance.

INSTRUCTOR AND CONTACT INFORMATION

Instructor:

Anna Gorbunova
Email: hubera2@mcmaster.ca
Office Hours: by appointment

Teaching Assistant:

Davoud Ghasimi
Email: ghasimid@mcmaster.ca
Office Hours: by appointment

Class Location: DSB 505

Class Hours

SEC01: 2:30-5:30
SEC02: 7:00-10:00

Course Website: <http://avenue.mcmaster.ca/>

COURSE DESCRIPTION

This course covers various numerical techniques to solve quantitative problems. Its primary objective is to develop a basic understanding of the construction of numerical algorithms and the applicability and limits of their use. An important component of this course is the learning of relevant computer programs such as Matlab. The main topics include standard algorithms for numerical computations, such as root finding for nonlinear equations, numerical differentiation, and numerical solutions of ordinary differential equations.

LEARNING OUTCOMES

Students will

- learn common numerical methods and their applications in finance
 - attain a level of comfort that allows them to use the software package Matlab in solving real world problems.
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REQUIRED COURSE MATERIALS AND READINGS

Required:

Paolo Brandimarte, Numerical Methods in Finance and Economics: A MATLAB-Based Introduction, second edition, by Wiley, 2006.

EVALUATION

3 Assignments (20% each)	60%
2 Tests	30%
Group Presentation	10%
Total	100%

Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

LETTER GRADE	PERCENT
A+	90 - 100
A	85 - 89
A-	80 - 84
B+	75 - 79
B	70 - 74
B-	60 - 69
F	00 - 59

Communication and Feedback

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student.

ACADEMIC DISHONESTY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at: www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

MISSED ACADEMIC WORK

Late assignments will not be accepted. No extensions are available except under extraordinary circumstances. Please discuss any extenuating situation with your instructor at the earliest possible opportunity.

STUDENT ACCESSIBILITY SERVICES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca.

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

POTENTIAL MODIFICATION TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in MFIN704 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

COURSE SCHEDULE

WEEK	DATE	TOPIC	WRITTEN ASSIGNMENT	GROUP PRESENTATION
Week 1	January 10	Introduction, Coding and Matlab		
Week 2	January 17	Sources of errors, computer numbers		Group 1
Week 3	January 24	Numerical Instability and Ill conditioning		Group 2
Week 4	January 31	Solving systems of linear equations, solving non-linear equations	Assignment 1	Group 3
Week 5	February 7	Finite Difference methods		Group 4
Week 6	February 14	Finite Difference methods		Group 5
Week 7	February 21	Reading Week		
Week 8	February 28	Simulation	Assignment 2	Group 6
Week 9	March 7	Midterm		
Week 10	March 14	Introduction to Optimization in Finance		Group 7
Week 11	March 21	Unconstrained Optimization		Group 8
Week 12	March 28	Heuristic Methods		Group 9
Week 13	April 4	Real world examples, wrap-up of the course	Assignment 3	Group 10
Week 14	April 11	Final Exam		