



THE UNIVERSITY OF THE WEST INDIES, MONA
ECON1003: Mathematics for Social Sciences I

Course Outline

Semester II, 2019/2020

3 credit hours

Lecturer Information:

Lecturer: Mr. Kino Morris
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Office: Sir Allister McIntyre Building, Block E, Room 205
Office Hours: Mondays 5-6 pm & 7-8 pm; and Fridays 4-6pm

Course Website: The course site on OurVLE (<https://ourvle.mona.edu/>)
Tutors: TBA

ALL STUDENTS ARE REQUIRED TO READ THIS DOCUMENT IN FULL
(Ignorance of course structure and/or policy will not be excused)

Course Requisites

Prerequisites: It is assumed that students have mastered the requisite skills covered in at least one of the following:

- CXC CSEC Mathematics – Grade III and above (Grade II and above pre 1998)
- GCE O'Level Mathematics – Grade C or above
- CXC CAPE Mathematics
- GCE A'Level Mathematics
- ECON0001 (Remedial Mathematics)
- GOVT0100 (Statistics & Mathematics for Policy Making)

Corequisites: Students must also be registered for or have already passed **ECON1005** (Introductory Statistics) or its equivalent.

Anti-requisites: Students may not take this course and any of the following courses and get credit for both:

- **MATH0100** (Pre-calculus)
- **MATH0110** (Calculus and Analytical Geometry)

Course Description

This course is designed to build on students' understanding of elementary mathematics and to expose them to some of the mathematical concepts that will be useful in the study of mathematical models in economics and the management sciences.

Emphasis will be placed on the understanding and application of mathematical concepts, rather than just computational skills and the use of algorithms and formulas.

The course is aimed at:

- Developing the mathematical skills needed to successfully navigate the seas of quantitative courses in economics and management studies.
- Developing an appreciation for the beauty and power of mathematics.

Mode of Delivery

- One (1) Lecture weekly [Duration: - two (2) hours]: where basic concepts will be taught and related examples used to concretize mathematical ideas and concepts.
- One (1) Tutorial weekly [Duration: - one (1) hour]: where students will share answers from given problems sets

N.B. Problem sets (not for grading) will be provided for practice at problem solving. These are to be done prior to each tutorial. Tutorials are **MANDATORY**.

Resources

This course will make extensive use of OurVLE. All course materials (lecture notes, problem sets and announcements) will be posted on the course site on OurVLE. All communication about this course will be made through the OurVLE course site and/or your official email provided to you by the University. Students must therefore be able to access the course site and their UWI email frequently.

I know that books are expensive. You will be provided with notes and problem sets. However, it is always good to have a book to read to get a broader understanding and to get additional practice. Any introductory text on college algebra and calculus will do. Here are some books that you might find useful:

Recommended Texts:

1. Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences by Haeussler, Paul and Wood.
2. Essential Mathematics for Economic Analysis by Sydaester and Hammond.

Other Materials: Scientific Calculator

Learning Outcomes

At the end of the course students will be able to use mathematical concepts and skills to solve problems in economics and management sciences.

Assessment

The course will be assessed using the following methods:

- 2 Mid-Semester Exams - 25% each
- 1 Comprehensive Final Exam - 50%

Mid-Semester and Final Exams

There will be two mid-semester exams and one final exam. Their dates and times are to be determined. Below is critical information about each exam.

	Weight	Date	Duration	Topics	Format
Midterm #1	25%	TBA	1 hour	TBA	MCQ*
Midterm #2	25%	TBA	1 hour	TBA	MCQ*
Final	50%	TBA	2 hours	The entire course (60% will cover the material not covered on Mid-Semester #1 or #2)	Structured & long answer questions

* MCQ = Multiple Choice Questions

NO MAKE-UP EXAMS WILL BE GIVEN

If you miss a mid-semester exam for a University approved reason (documentation required), your final will be worth (50% + 25%). Otherwise, your final is worth 50%.

Note that failure to shade your ID number correctly on your MCQ answer sheet will result in a 5% deduction from your grade. The same deduction is applicable for failure to write your correct ID number on the required pages on/in your answer booklet.

Course Policies

Attendance

Students are expected to attend all lectures and tutorials. If you miss a lecture or tutorial, it is the student's responsibility to get the relevant notes from a classmate.

Tutorials

Each tutorial represents a discussion session about the tutorial questions. This will include randomized selection of individual students putting answers to tutorial questions on the board for discussion each week and/or any other appropriate teaching/learning method.

Students are required to arrive at tutorials on time and ready to work questions on the board. Therefore, **students are required to attempt all tutorial questions prior to the tutorial.** The role of the tutor is not to do the tutorial questions but to assist students through the tutorial questions. Therefore, an attempt must be made by students prior to the tutorial session.

Please immediately inform your lecturer if your tutor is absent or late to tutorials. Also let your lecturer know if your tutor is not performing within the parameters outlined above. Our aim is to rectify issues as early as possible.

Lectures

Based on the syllabus below, you will realize that we have a substantial amount of material to cover. This means that we will be going through concepts quickly, giving only 1 or 2 applications/examples of each as necessary. The lectures are designed to introduce you to these concepts, and the tutorials should help you fill-in-the-blanks in understanding and practice. The onus is upon you to practice on your own, and help yourself grasp the concepts clearly.

Each student is expected to print the lecture notes posted on OURVLE for each unit (AS THEY ARE MADE AVAILABLE), and walk with them to class, so that we can go through the concepts together without rewriting the notes. This also helps you to make additional jottings on the notes to help with your understanding. Additional workings of examples and questions may otherwise be done in your notebook.

Use of Technology in Classes

During lectures and tutorials:

- students may use their laptops or tablets to take notes
- all cell phones MUST be turned off or put on silent.
- students are not allowed to answer their cell phones while in the classroom. If there is an emergency, you must take your call (including answering the phone) outside of the classroom with minimal disruption to your fellow classmates and/or your tutor or lecturer.
- the use of earbuds/headphones is strictly prohibited.

Communication

Important information regarding midsemesters and final exams are not communicated on OURVLE. It is the student's responsibility to check the Exam's Notice Board for the exact dates of mid semester and final exams.

Emails sent to lecturers and tutors between Monday and Thursday (8am – 5pm) will be responded to within 24 hours. Emails sent between Friday and Sunday will be responded to on the next valid work day. This also applies emails sent during a holiday period.

Students with Disabilities

Students with disabilities MUST register with The Office of Special Student Services (OSSS) **and** your lecturer so that the necessary accommodations may be made for you. Also see Section II of the Assessment Regulations for First Degrees, Associate Degrees, Undergraduate Diplomas and Certificates 2017-2018 document.

(https://www.mona.uwi.edu/registry/sites/default/files/registry/uploads/Assessment_Regulations_2017-2018_Final.pdf)

How to Succeed in this Course

SOME TIPS ON HOW TO GET AN A+:

You need to:

1. Print off the lecture notes and fill them in during class
2. Attend classes (lectures and tutorials)
3. Engage in classes (lectures and tutorials) – ask questions; answer questions
4. Read the course material and notes given in class and try to review important concepts
BEFORE CLASS
5. Complete tutorials prior to your tutorial time
6. Attend office hours
7. Email your lecturer or tutor if you need any assistance with understanding certain concepts or examples
8. Keep track of questions you have that may develop in class, tutorials or your personal study and contact either your lecturer or your tutor
9. Work consistently throughout the semester. **Rule of thumb: study and practice for a minimum of 5 hours every week (i.e. 1 hour per day for 5 days) separate and apart from lectures, tutorials, and office hour visits.**

N.B. The following is a warning to those who have a fear of math: If you know that this applies to you, your rule of thumb is a minimum study and practice time of 7 hours every week (i.e. 1 hour for every day of the week) separate and apart from lectures, tutorials, and office hour visits.

You must also ensure that you visit any of the tutors' or the lecturer's office hours at least once or twice for the week, or as many as you are able to make it to. Don't try to tackle it by yourself, GET IMMEDIATE HELP!!!

Course Syllabus

Section A: PRE-CALCULUS

Unit 1: Functions

- 1.1 Definition of a function
- 1.2 Evaluating functions
- 1.3 Domain, range and graphs of functions
- 1.4 One to one and onto functions
- 1.5 Composition of functions
- 1.6 Inverse functions and their graphs
- 1.7 Special functions and their graphs (polynomial, rational, absolute value, square root)
- 1.8 Transforming graphs (horizontal and vertical shifts, reflection)

Unit 2: Inequalities

- 2.1 Linear inequalities including absolute value and double inequalities
- 2.2 Solving quadratic inequalities graphically
- 2.3 Graphs of systems of linear inequalities
- 2.4 Applications of inequalities (profit, sales allocation, investment)

Unit 3: Equations

- 3.1 Brief review of linear and quadratic equations
- 3.2 Cubic equations – Remainder and Factor Theorems
- 3.3 Nonlinear equations to include radicals and absolute value
- 3.4 Manipulation of formulas

Unit 4: Exponential & Logarithmic Functions

- 4.1 Graphs of exponential and logarithmic function
- 4.2 The natural exponential and natural logarithmic function
- 4.3 Basic properties of logarithmic
- 4.4 Solving exponential equations
- 4.5 Applications

Unit 5: Matrix Algebra

- 5.1 Matrix addition, multiplication and transposition
- 5.2 Determinants of (2x2) and (3x3) matrices
- 5.3 Cramer's Rule

Unit 6: Sequences

- 6.1 Definition of a sequence (general terms and recursive definition)
- 6.2 Sigma notation, including double sums

Section B: CALCULUS

Unit 7: Limits & Continuity

- 7.1 Concept of a Limit
- 7.2 Limits of Polynomial and Rational Functions including limits to infinity
- 7.3 One-Sided Limits
- 7.4 Distinguish between Continuous and Discontinuous Functions
- 7.5 Finding points of discontinuity of Rational Functions

Unit 8: Differentiation of Single Variable Functions

- 8.1 The concept of the derivative
- 8.2 Rules of differentiation (power, chain, product, quotient rules)
- 8.3 Higher order derivatives
- 8.4 Differentiation of Exponential and Logarithmic Functions
- 8.5 Marginal functions
- 8.6 Relative extrema (maxima/minima) using the first and second derivative tests