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

SEMESTER/YEAR:	**Semester II - 2018/19**
OFFICE HOURS:	**Mondays 11am – 12noon & Tuesdays 6pm – 7pm**
PRE-REQUISITES:	**CXC Mathematics Grade III** (Grade II pre-1998) or **O' Level Mathematics Grade C** or **A' Level Mathematics** or **ECON001 (Remedial Mathematics)** or **Govt0100** (Statistics and Mathematics for Policy Making)
ANTI-REQUISITES:	**MATH0100** (Pre-calculus) & **MATH0110** (Calculus and Analytical Geometry)
CO-REQUISITE:	**ECON1005** (Introductory Statistics)
LECTURER:	**Mr. Kino Morris** *Email: kino.morris@uwimona.edu.jm*

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

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.

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.

MODES OF DELIVERY:

- One (1) Lecture weekly [Duration: - two (2) hours]
- One (1) Tutorial [Duration: - one (1) hour].

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.**

RULES FOR TUTORIALS & LECTURES:

- Students are required to arrive at tutorials on time and ready to work questions on the board. Your answers do not have to be complete or 100% accurate but you must have attempted the questions using the material taught in class or lecture (or from other sources). The tutorials are for students to gain a much deeper understanding of what was done in lectures.

- Students are expected to ask questions in the lectures and/or be engaging. If there are any problems with understanding the material, students should raise their hands and ask the lecturer for clarification, and not wait until the end of the lectures or close to exams to bombard the office hours of the lecturer. Any questions that cannot be answered at the time in which it is asked, an answer will be given in a timely manner (during the next class) after consideration or further research. As it will be expected, students may not understand all the material the first time, even after asking for clarity.

- In the case that a student misses a lecture (without official documentation explaining the absence), he/she will not be facilitated; lectures will not be re - delivered. The same goes for tutorials (unless other discretions are made by the tutor).

- **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 be done otherwise in your notebook.**

COURSE ASSESSMENT:

Two mid-semester examinations (MCQ)	**25% each**
A Comprehensive Final examination	**50%**

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

RESOURCES:

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.

SOME TIPS ON HOW TO GET AN A+:

You need to:

1. Read course material and notes given in class and try to review important concepts **BEFORE CLASS.**

2. Engage with the material and lecturer during class, tutorials and office hours

3. 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. ***<u>The following is a warning to those who have a fear of math:</u>*** **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!!!

4. Keep track of the questions you have and clarifications you need, which you have developed from personal studies or in lectures and raise them in lecture, tutorial or the office hours of a tutor or the lecturer.