THE UNIVERSITY OF THE WEST INDIES
ST. AUGUSTINE, TRINIDAD AND TOBAGO, WEST INDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
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Course Title: MATHEMATICS FOR ECONOMICS I

Course Code: ECON 1003

Course Type: Core

Level: 1

Semester: 1 and 2

No. of credits: 3

Prerequisites: ECON0001 **or** PASS in the Mathematics Proficiency Test (MPT)

Department: ECONOMICS

LECTURER/INSTRUCTOR INFORMATION

Name	Office address	Email address	Office hours
Dr Regan Deonanan (Coordinator)	FSS 107, Room 10	Regan.Deonanan@sta.uwi.edu	Virtual (by appointment)
Dr Ricardo Lalloo	FSS Room 222	Ricardo.Lalloo@sta.uwi.edu	Virtual (by appointment)

COURSE DESCRIPTION

The course is organized around three (3) areas of Introductory Mathematics for the Social Sciences: Functions, Matrices and Calculus. Significant linkages exist among these core areas and understanding both the application of underlying theory and how they are linked are critical for acquiring introductory Social Science quantitative skills. Accordingly, this course systematically presents the underlying theory in each of these core areas, at an introductory level. Presentation of the theory is supported with several examples on their application to problem solving. Assessment will take the form of Coursework. This course is intended to prepare students to read level 2 quantitative courses in the Social Sciences.

COURSE RATIONALE

Economics is a Social Science. As such, an effective appreciation and application of Economic theory, as with other Sciences, requires a quantitative background. This course comprises one of several quantitative courses in Economics aimed at developing a sufficient quantitative grounding and emphasizes the acquisition of introductory quantitative skills required for ongoing training within Economics, and other areas in the Social Sciences.

Mathematics for Economics I builds on students' understanding of elementary mathematics (as gained at CXC Mathematics (General Proficiency) or G.C.E. 'O' Level Mathematics) and exposes them to mathematical concepts that underpin the mathematical models that will be encountered in the Level II/III courses in the following programs: B. Sc. Economics, B. Sc. Management Studies, B.Sc. Accounting, B. Sc. Banking & Finance, B.Sc. Hotel Management, B.Sc. Hotel Management, B.Sc. International Tourism, B.Sc. Hospitality & Tourism Management and B.Sc. Sports Management.

COURSE LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

1. Describe the link among functions, equations, and inequalities
2. Distinguish among different types of functions, equations, and inequalities
3. Identify appropriate methods to solve different types of equations and inequalities
4. Defend methods utilized to solve different types of equations and inequalities
5. Solve equations and inequalities algebraically, graphically or with the use of matrices
6. Interpret solutions to equations and inequalities
7. Set up worded problems in terms of functions
8. Solve problems requiring the application of calculus methods

COURSE ASSESSMENT

Assessment Type	Weight %
Coursework	100%

The assessment for this course consists of 100% coursework. Under this system, there will be a total of five (5) exams that will be administered on the MyElearning platform. Each of the five exams will count for 20% of the overall grade, totaling 100% over the five exams.

This exam structure affords many opportunities for you to do well in this course. Each exam focuses on a different section of the course, as opposed to an exam that covers all material at once.

The following is the tentative exam schedule for the semester:

- Exam #1 is scheduled for **Saturday 12th February**. This exam will be based on‘Functions’ in its entirety.
- Exam #2 is scheduled for **Saturday 26th February**. This exam will be based on‘Inequalities’ in its entirety.
- Exam #3 is scheduled for **Saturday 12th March**. This exam will be based on the topics of 'Exponential and Logarithmic Functions', 'Sequences and Series', and 'Limits and Continuity'.
- Exam #4 is scheduled for **Saturday 26th March**. This exam will be based on the topics of 'Differentiation' and 'Applications of Differentiation'.
- Exam #5 is scheduled for **Saturday 9th April**. This exam will be based on the topic of 'Matrices'.

TEACHING STRATEGIES

The course will be delivered online by way of recorded lectures and tutorials, along with live tutorial sessions, additional MyeLearning resources, past papers, and consultations during virtual office hours. These resources will be made available from the start of the course for the duration of the semester. Students will be required to view recorded content to at least meet the schedule outlined by the Course calendar. Online logs are recorded to monitor students’ access to these resources. Thus, students must show that they are accessing these activities.

COURSE SCHEDULE

Week	Content	Resources	Assignments Due
1	Introduction	**LIVE LECTURE**; Diagnostic Exercise	n/a
2	Functions	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Diagnostic Exercise
3	Functions (continued)	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 1
4	Solutions of Inequalities	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 1; **EXAM 1**
5	Exponential and Logarithmic Functions	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 2
6	Sequences and Series; Complex Numbers	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 3; **EXAM 2**
7	Limits and Continuity	**LIVE LECTURE;** Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 4
8	Differentiation	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 5; **EXAM 3**
9	Applications of Differentiation	Recorded Lecture; Recorded Tutorial; Live Tutorial;	Tutorial Sheet 6

		Course textbook; MyeLearning notes/videos	
10	Matrix Algebra	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 7; **EXAM 4**
11	Matrix Algebra (continued)	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 8
12	Review of Course Material	Recorded Lecture; Recorded Tutorial; Live Tutorial; Course textbook; MyeLearning notes/videos	Tutorial Sheet 8; **EXAM 5**

COURSE ROADMAP

We encourage you to make use of the resources provided for this course. These include recorded lectures, reading and video links posted under each course topic on MyElearning, tutorial sheets and past exam papers, recorded tutorials, live tutorial sessions, and virtual office hours.

With all these resources available to you from the beginning of the course, it is recommended that you utilize these resources in the following order:

- **Read** the material to be covered prior to viewing lecture content.
- **View** the recorded lectures that are available for each topic by the end of the assigned week on the course calendar.
- **Attempt** the corresponding tutorial sheet after viewing each topic.
- **View** the recorded tutorial videos.
- **Attend** one of the weekly live tutorial sessions using the Blackboard Collaborate platform. These sessions are there to facilitate your questions regarding course content, whether it is theory, tutorial sheet questions, or past paper questions.
- If you continue to have questions regarding the course material after utilizing all the available resources, you can request an appointment via email for virtual office hours with the course lecturers.

IMPORTANT NOTICE TO STUDENTS

CONTENT

Functions

Readings:
Haeussler, Paul & Wood Chapter 0 pg 27 – 43; Chapter 2 pg 75 – 102; Chapter 3 pg 117 – 147; Chapter 4 pg 163 – 193 or
T*an Chapter 1 pg 03 – 55; Chapter 10 pg 529 – 556; Chapter 13 pg 810 – 832*

- Definition of a function
- Function Notation and Evaluating Functions
- Domain and Range of Functions
- Composition of Functions
- Inverse Functions
- Special Functions (Constant, Polynomial, Rational, Absolute Value)
- The Remainder and Factor Theorem and Solution of Cubic Equations
- Application of Functions (Depreciation, Demand and Supply Curves, Production Levels)
- Sketching Graphs of Functions (Constant, Linear, Quadratic, Square Root, Absolute Value)
- Transforming Graphs (Horizontal and Vertical Shifts, Reflection in the X-axis)
- Solution of equations (Linear, Quadratic, Absolute Value, Cubic, Rational)
- Solutions of system of equations (Linear and Non-Linear)

Solutions of Inequalities

Readings:
Haeussler, Paul & Wood Chapter 1 pg 47 - 60 or
Tan Chapter 3 pg 171 – 179; Chapter 9 pg 520 – 525

- Systems of Linear Inequalities
- Solving Linear, Absolute Value and Quadratic Inequalities
- Graphs of Systems of Inequalities
- Applications of Inequalities (Profits, Sales Allocation, Investment)

Complex Numbers

- The Definition of Imaginary Numbers
- The Definition of Complex Numbers
- Addition, Multiplication and Division of Complex Numbers

Exponential and Logarithmic Functions

- Graphs of Exponential and Logarithmic Function
- The Natural Exponential and Natural Logarithmic Function
- Basic Properties of Logarithm
- Solving Exponential and Logarithmic Functions
- Applications

Matrix Algebra

Readings:
Haeussler, Paul & Wood Chapter 6 pg 227 - 270 or
Tan Chapter 2 pg 73 – 155

- Definition of a Matrix
- Matrix Addition, Multiplication and Transposition
- The Determinant of a 2X2 and 3X3 Matrix
- The inverse 2X2 and 3X3 Matrix
- Solving 2X2 and 3X3 Systems of Linear Equations Using Matrix Inversion (Adjoint Method) and Cramer's Rule
- Equivalent Matrices

Sequences and Series

- Definition of a Sequence
- Types of Sequences (Arithmetic and Geometric)
- Sigma Notation
- Arithmetic and Geometric Series
- Sums of Arithmetic and Geometric Series including sums to infinity

Limits and Continuity

Readings:
Haeussler, Paul & Wood Chapter 10 pg 449 – 465 or
Tan Chapter 10 pg 576 – 614

- Concepts of a Limit
- Limits of Sequences

- Limits of Polynomial and Rational Functions
- One-Sided Limits
- Limits to Infinity
- Distinguish between Continuous and Discontinuous Functions
- Finding Points of Discontinuity of Rational Functions

Differentiation of Single Variable Functions

Readings:
Haeussler, Paul & Wood Chapter 11 pg 481 – 523 or
T*an Chapter 10 pg 615 – 629; Chapter 11 pg 640 - 700*

- The Concept of a Derivative
- Differentiation from First Principles
- Rules of Differentiation (Power, Sum/Difference, Chain, Product, Quotient Rules)
- Differentiation of Exponential and Logarithmic Functions

Applications of Differentiation

Readings:
Haeussler, Paul & Wood Chapter 12 pg 529 – 538;
Chapter 13 pg 567 – 579, 587 – 588 & 599 – 610 or
Tan Chapter 12 pg 729 – 765, pg 781 – 795; Chapter 13 pg 833 - 851

- Determination of Gradients
- Increasing and Decreasing Functions
- Relative Extrema (Maxima and Minima) using the First and Second Derivative Tests
- Concavity and Points of Inflection
- Vertical and Horizontal Asymptotes
- Derivative as a Rate of Change

EVALUATIONS

At the end of the course, feedback will be solicited on how the information is being processed and the course in general. The feedback will be used to make improvements, correct errors, and try to address the students' needs.

RESOURCES

Students should obtain a copy of the following required text:

- **Haeussler, E., Paul, R. and Wood, R**., Introductory Mathematical Analysis for Business, Economics and the Life and Social Sciences**,** Twelfth Edition Prentice Hall. 2008 (or most recent edition).

READINGS

The following are suggested texts:

- **Tan, S. T.**, College Mathematics for the Managerial, Life and Social Sciences**,** Sixth Edition, Thomson Brooks/Cole. 2005 (or most recent edition).
- **Dowling, Edward T**., Calculus for Business, Economics, and the Social Sciences, Schaum's Outline Series, McGraw-Hill.
- **Hoffman, L. D**. Calculus for Business, Economics, and the Social Sciences, McGraw-Hill.
- **Ayres, Frank** Calculus, 2nd Edition, New York, McGraw-Hill, 1964
- **Lewis J Parry** An Introduction to Mathematics for Students of Economics. Macmillan 197

ADDITIONAL INFORMATION

- **ACCESSING ONLINE RESOURCES**

  Students are responsible for accessing the course material. Logs will be kept to monitor student access to online resources such as recorded lectures and recorded tutorial content.

- **POLICY REGARDING CHEATING**

  Academic dishonesty including cheating is not permitted. For more information, read Section V (b) Cheating in the *Examination Regulations for First Degrees, Associate Degrees, Diplomas, and Certificates* online via the Intranet.

- **STATEMENT ON DISABILITY PROCEDURE**

  The University of the West Indies at St. Augustine is committed to providing an educational environment that is accessible to all students, while maintaining academic standards. In accordance with this policy, students in need of accommodations due to a disability should contact the Academic Advising/Disabilities Liaison Unit (AADLU) for verification and determination as soon as possible after admission to the University, or

at the beginning of each semester.

- **POLICY REGARDING INCOMPLETE GRADES**

  Incomplete grades will only be designated in accordance with the University's Incomplete Grade Policy.

HOW TO STUDY FOR THIS COURSE

Prior to each lecture, students should pre-read the material to be covered as indicated in the course schedule. Post the lecture, students should complete the weekly tutorial sheet to re-enforce material previously covered.

Tutorial assignments are designed to help students flesh out concepts and practice the application of the logic and concepts to a range of problem situations. These are important in this course since they provide the basis for formal practice and assist in reinforcing the concepts introduced in lectures. It is expected that students will also use the texts and recommended references. Every effort should be made to complete each tutorial sheet within the assigned time.

Students are advised to read through each tutorial assignment to identify the concepts required for its solution prior to revising the concepts so identified; it is only after such revision that you should proceed to attempt the solutions. Some questions in an assignment sheet will be solved in one attempt; others will require more than one attempt. Students are encouraged to adopt co-operative learning approaches (i.e. working with another student or students) to solve the more challenging questions in the tutorial sheet.

If after the individual effort and the co-operative learning effort, the student feels challenged by a question(s), he/she owes it to himself/herself to seek out the Course Lecturer or Tutor for guidance or Adjunct for guidance and assistance.

Overall students should invest a minimum of **seven (7) hours per week** apart from lectures, tutorial classes and office hours to this course.

GRADING SYSTEM

2014/2015 Grading Policy		
Grade	**Quality Points**	**Mark%**
A+	**4.3**	**90-100**
A	**4.0**	**80-89**
A-	**3.7**	**75-79**
B+	**3.3**	**70-74**
B	**3.0**	**65-69**
B-	**2.7**	**60-64**
C+	**2.3**	**55-59**
C	**2.0**	**50-54**
F1	**1.7**	**45-49**
F2	**1.3**	**40-44**
F3	**0.0**	**0-39**

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