THE UNIVERSITY OF THE WEST INDIES, MONA

ECON1004: Mathematics for the Social Sciences 2

Semester I & II

Pre-requisites: ECON1003 or A'Level Mathematics or CAPE Pure Mathematics Units 1 & 2

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Office Hours: Mon 6 – 7 pm & Tue 10 – 11 pm
(If you cannot make these times you can email me or text or WhatsApp me at 406 – 7956 to arrange a meeting. P.S. Please don't send me any "Please call me" texts – I will not call.)

Description

This course builds on the basic ideas of Differential Calculus explored in ECON1003. Students will also be introduced to Integral Calculus and the mathematical processes that are required to access the quantitative elements of Economics and Management Sciences.

Learning Outcomes

Upon successful completion of this course, the student should be able to:

- Use L'Hopital's rule to evaluate a wide range of limits
- Find the derivatives of a variety of algebraic, transcendental and trigonometric functions of single and several variables.
- Use differentials to find approximations for functions of single and several variables
- Evaluate indefinite, definite and improper integrals using

  (i) The power rule
  (ii) substitution
  (iii) integration by parts

- Use Maclaurin series to approximate definite integrals
- Use the definite integral to find area
- Find the relative extrema of functions of two variables (unconstrained)
- Evaluate double integrals over rectangular regions

Modes of Delivery

Two lecture hours and one tutorial hour per week. Problem sets (not for grading) will be provided for practice at problem solving.

Assessment

Course Work - 50%

- Two in – class quizzes (10% each) 20%
- One multiple choice exam 30%

Final Exam – 50%

Syllabus

1. Differentiation of Single Variable Function

1.1 Increasing and decreasing functions
1.2 Concavity
1.3 Chain Rule, Sine and Cosine, and Implicit Differentiation
1.4 General Exponential and Logarithmic Functions
1.5 Logarithmic Differentiation

2. Limits

1.1 Review of limits
1.2 L'Hospital's rule for indeterminate forms $\frac{0}{0}$ and $\frac{\infty}{\infty}$.
1.3 L'Hospital's rule for indeterminate forms $0\times\infty$ and $\infty - \infty$.

3. Applications of Differentiation of Single Variable Functions

3.1 Total differentials and approximate changes
3.3 Maclaurin Series

4. Integration

4.1 Indefinite Integration
4.2 Methods of Integration (substitution, parts)
4.3 The Riemann (definite) integral
4.4 The Fundamental Theorem of Calculus
4.5 Areas and Applications
4.6 Improper Integrals

5. Multivariate Calculus (2 and 3 variables)

5.1 Partial Differentiation
5.2 The Chain Rule
5.3 Implicit Differentiation
5.4 Total differentials and approximate changes
5.5 Unconstrined Optimization
5.7 Homogenous functions and Euler's Theorem
5.8 Double Integrals

Resources

Prescribed Text: Michael Hoy *et al*, *Mathematics for Economics, 2nd Edition.*