



## COURSE COMPACT

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**Faculty:** Faculty of Science  
**Department:** Computer & Information Sciences  
**Programme:** B.Sc Computer Science  
**Course Code:** MTH 121  
**Course Title:** Elementary Mathematics III - Calculus  
**Units:** 3  
**Course Lecturer:** Aroloye S. J. (Ph.D)  
**Semester/Session:** Second  
**Session:** 2018/2019  
**Location:** Lecture Room

### A. Brief Overview of Course

Functions of real-variables: Graph, limits, and concepts of continuity. Techniques of differentiation of algebraic and trigonometric functions, higher order derivatives, maxima and minima, Liebnitz rule, application of differentiation. Integration as inverse of differentiation, methods of integration, definite integral. Application to areas, volume, moment of inertia. Approximate integration: Trapezoidal and Simpson's rule. Taylor's and Maclaurin's theorems, partial differentiation and implicit differentiation

### B. Course Objectives/Goals

At the end of this course, students are expected to:

- Understand function of real variable-Graph, limits and concepts of continuity.
- Have a good understanding of techniques of differentiation of algebra and trigonometric function
- Know how to solve higher order derivatives, maxima and minima
- Understand Liebnitz rule and application of differentiation
- Understand the concept of integration as inverse of differentiation
- Understand method of integration, definite integral.
- Understand application of integration to areas, volume, moment of inertia.
- Know how to solve Approximate integration
- Understand Trapezoidal and Simpson's rule
- Understand the basic concept of Taylor's and Maclaurin theorems,
- Understand partial differentiation and implicit differentiation

### **C. Methods of Lecture Delivery/Teaching Aids**

- Lecture Delivery Methods
  - Interactive classroom session
  - Individual assignments
  - Lecture notes
- Teaching Aids
  - Multimedia projection

### **D. Course Outlines**

- Modules & Details of Topics

#### **Module I: Function of real variable**

**Weeks 1 & 2:** Graph, Limits and Concept of continuity

**Week 3:** Concept of continuity

Continuous Assessment One (CA1)

#### **Module II: Techniques of differentiation**

**Week 4:** Techniques of differentiation of algebra and trigonometric functions

**Week 5:** Higher order derivative, maximum and minima, application of differentiation

Mid-Semester Test

#### **Module III: Integration As inverse of differentiation**

**Weeks 6 :** Definite integral

**Week 7& 8:** Application to area, volume, moment of inertia

#### **Module IV: Approximate integration**

**Week 9:** Trapezoidal and Simpson's Rule

**Week 10:** Maclaurin's theorems

**Week 11:** PDE and implicit differentiation

Continuous Assessment Two (CA2)

**Week 12:** Revision

### **E. Structure of the Programme/Method of Grading**

- Continuous Assessment
  - Class test/Assignments 20% Marks
  - Mid Semester test 10% Marks

- Examination 70% Marks
- TOTAL 100%**

#### **F. Ground Rules & Regulations**

- 75% attendance is required to sit for the examination.
- Assignments must be submitted as at when due.
- Contributions to group discussion and class work are noted.

#### **G. Topics of Term Papers/Assignment/Student Activities**

- Oral group defense.

#### **H. Contemporary Issues/Industry Relevance**

**Calculus** provides concepts that are crucial to many areas of **computer science**, engineering, including graphics, image processing, cryptography, machine learning, **computer** vision, optimization, graph algorithms, quantum computation, computational biology, information retrieval and web search.

#### **I. Recommended Reading/Texts**

- a. Frank A (2013). Calculus- Schaum's series 6<sup>th</sup> edition, Pearson Addison Wiley.
- b. Green G. B (2000). calculus for beginner: Third edition