Course Synopsis: MTH 102 – Elementary Mathematics II

Lagos State University  
Department of Computer Science  
100 Level – Second Semester  
Credit Units: 3

# Course Description / Synopsis:

This course builds on the foundational mathematics taught in MTH 101. It focuses on advanced concepts in algebra, analytic geometry, calculus, and introductory linear algebra. Students are introduced to topics such as sequences and series, conic sections, differentiation and integration of algebraic functions, matrices, and determinants. The course provides students with the mathematical tools necessary for advanced studies in computer science and other science-related disciplines.

# Course Objectives:

* Understand and apply the concept of sequences and series.
* Analyze and interpret conic sections (parabola, ellipse, hyperbola).
* Differentiate and integrate algebraic and simple transcendental functions.
* Use calculus to solve basic problems involving rates of change and areas under curves.
* Understand and manipulate matrices and determinants.
* Apply matrix methods to solve systems of linear equations.

# Course Outline / Topics:

1. Sequences and Series

* Arithmetic and geometric sequences
* Summation formulas
* Convergence and divergence (basic introduction)

1. Analytic Geometry

* Conic sections: parabola, ellipse, and hyperbola
* Equations and properties of conics

1. Differential Calculus

* Derivatives of algebraic and simple transcendental functions
* Rules of differentiation: product, quotient, and chain rules
* Applications: maxima, minima, curve sketching

1. Integral Calculus

* Basic integration techniques
* Definite and indefinite integrals
* Applications: area under a curve

1. Matrices and Determinants

* Matrix operations: addition, multiplication, transpose
* Determinants of 2x2 and 3x3 matrices
* Inverse of a matrix
* Solving linear equations using matrices (Gaussian elimination, Cramer's Rule)

# Teaching Methods:

* Lectures and tutorials
* Worked examples and practice problems
* Use of graphing tools and visual aids
* Class discussions and quizzes

# Assessment Methods:

Continuous Assessment: 30%  
- Class tests  
- Assignments  
- Quizzes

Final Examination: 70%