Adama Science and Technology University

School of Applied Natural Sciences

Mathematics Program

Course title: **Applied Mathematics III**

Course code: Math 2302

Credit hours: 4 Contact hrs: 3 Tutorial hrs: 3

Prerequisite: Math 1102

Course Content

1. **Ordinary Differential Equations of the first order**
   - 1.1 Preliminary concepts
   - 1.2 Separable Equations
   - 1.3 Homogeneous Differential equations
   - 1.4 Exact Differential Equations
   - 1.5 Integrating factors
   - 1.6 Linear first order Differential Equations

2. **Ordinary Linear Differential Equations of the second order**
   - 2.1 Homogeneous Linear Differential equations of the second order
   - 2.2 Homogeneous second order Differential equations with constant coefficients
   - 2.3 General solutions, Basis
   - 2.4 Real Roots, Complex Roots and Double Roots of the Characteristics Equations
   - 2.5 Method for solving non-homogeneous linear Differential Equations
   - 2.6 System of Differential Equation

3. **Fourier Series and Integrals**
   - 3.1 Periodic functions, Trigonometric Series
   - 3.2 Fourier Series and Integrals

4. **Laplace Transforms**
   - 4.1 Laplace Transformations
   - 4.2 Differential and Integration of Laplace Transformations
   - 4.3 Convolution and Integral Equations

5. **Vector Calculus**
   - 5.1 Scalar Field and vector Fields
   - 5.2 Vector Calculus
   - 5.3 Curves, Arc Length and Tangent
   - 5.4 Gradient of a scalar Field, Divergence and Curl of a vector Field
   - 5.5 Line Integrals, Line Integral Independent of Path and Greens Theorems
   - 5.6 Surface Integrals, Gauss Divergence Theorem and Its Application
   - 5.7 Stock's Theorems and Its application

6. **Complex Analysis**
   - 6.1 Complex Analytic Functions.
   - 6.2 Complex Integrals.
   - 6.3 Integration by method of residue

Text book: Erwin Kreyszig: Advanced Engineering Mathematics

References:

1. Edwards and Penney: Calculus and Analytic Geometry
2. Zill D.G: A first course in differential equations with applications. International edition, 1981
3. Kaplan W: Ordinary Differential equations
4. Ross S. L: Differential equations
5. Martin R.H: Ordinary Differential equations
6. M.D Raisinghania: Ordinary and Partials Differential Equations