TRINITY UNIVERSITY
Building on the Rock

COURSE COMPACT

Faculty: Faculty of Science
Department: Computer & Information Sciences
Programme: B.Sc Computer Science
Course Code: MTH 122
Course Title: Elementary Mathematics IV- Vector and Algebra (2 Units)
Units: 2
Course Lecturer: **Aroloye S. J. (Ph.D)**
Semester/Session: Second
Session: 2018/2019
Location: Lecture Room

A. Brief Overview of Course

3-D Cartesian coordinate systems. Definition and representation of vectors; Algebra of vectors: multiplication of a vector by a scalar, addition of vectors, scalar product of two vectors, vector product of two vectors, direction cosines, calculus of vector function: differentiation of vector function, integration of vector function; conic: circles, parabola, ellipse and hyperbola; kinematics of a Particle: basic concepts, motion under constant acceleration, motion under variable acceleration: rectilinear motion, motion in a plane. Force.

B. Course Objectives/Goals

At the end of this course, students are expected to:
- Understand and recognize 3-D Cartesian coordinate systems
- Understand definition and representation of vectors
- Solve multiplication of a vector by a scalar and addition of vectors
- Be able to solve scalar product of two vectors and vector product of two vectors
- Be able to solve and interpret direction cosines, calculus of vector function: differentiation of vector function
- Solve questions involve integration of vector function;
- Understand conic: circles, parabola, ellipse and hyperbola;
- Know basic concept of kinematics of a Particle
- Solve questions on motion under constant acceleration, motion under variable acceleration

- To solve questions on rectilinear motion, motion in a plane.
- Force.

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: 3-D Cartesian Coordinate systems

Weeks 1:   Definition and representation of vector

Module II: Vector Algebra

Week 2 and 3: Multiplication of a vector by a scalar, addition of vectors. Scalar product of two vectors and vector product of two vectors, direction cosines

Continuous Assessment One (CA1)

Module II: Calculus of Vector function

Week 4: Differentiation of vector functions

Week 5: Integration of vector functions

Mid-Semester Test

Module III: Conic

Weeks 6 & 7: Circles, Parabola, ellipse

Week 8: Hyperbola

Module IV: Kinematics

Week 9: basic concept of kinematics, motion under constant acceleration and Motion under variable acceleration

Week 10: Rectilinear motion, motion in a plane

Week 11: Force

      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 defense of group assignment

H. Contemporary Issues/Industry Relevance

Vector and kinematic provides concepts that are crucial to many areas of **computer science**, 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. Mai. L. H. (2009). Vector Analysis: Schaum's Outine series. Second edition

b. Bright H. J. (2015). Vector for Beginners. third edition