**MET 1104 Differential and Integral Calculus (3 CU)**

**Description**

The Course is about rate of change of quantities and their applications in real life terms. The Concept of integral Calculus and its applications are also considered.

**Objectives**

The course will help the students to achieve the following objectives

* Understand the concepts of function, limit and their applications
* Explain the rules of differentiability and apply them in real life situations
* Describe the concept of integration and its applications

**Learning outcomes**

By the end of this Course, the student should be able to:

* Define a function, a limit and compute limits of functions and check for continuity of functions.
* Use definitions and rules of differentiation to compute derivatives of functions.
* Apply derivative concepts in real life situations
* To compute integrals and apply the integral concept.

**Intellectual, Practical and transferable skills**

* Problem solving
* Analytical
* communication

**Teaching and learning patterns**

The mode of learning involves direct contact with students in form of lectures, Tutorials and assignments.

**Indicative Content**

* Functions: Definitions, Limits and continuity of Functions.
* Derivatives: Definitions of a derivative, techniques of differentiation i.e. product, power, quotient, implicit, chain rule, parametric and logarithmic differentiation.
* Applications of Derivatives: Stationery points, curve sketching, concavity, rates of change, Mean value theorem, L’ Hopital’s rule.
* Integration: Indefinite integrals and the anti-derivatives. Definite integrals. Techniques of integration i.e. substitution, parts, partial fractions. The fundamental theorems of integral calculus.
* Applications of Definite Integrals: Net change in position and Distance Traveled by a moving body. Area under Curves, Volumes of revolution. Volumes Modeled by Cylindrical Shells. Length of planar Curves. The area of a surface of revolution. The Mean value of a function, Moments and Centers of Mass, Work i.e**. *W = Sba F(x)dx***. Hydrostatic force.
* Differential Equations: First order Linear, Seperable. Second order O.D.Es with constant coefficients.

**Assessment Method**

The assessment method is structured to include course work, and final examination. Course work consists of assignments, reports and tests and accounts for 30% of the final grade. The final examination will account for 70% of the final grading

**Core Reference materials**

* **Thomas G. B. and Finney R.L** (1996): Calculus and Analytical Geometry (9th edition), *Addison Wesley*
* **Earl D.Rainville** (1997): Elementary Differential Equations, *Prentice Hall*