Course Code  MH2100
Course Title  Calculus III
Pre-requisites  MH1101 Calculus II
Contact Hours  4 hours per week (3 hours of lecture, 1 hour of tutorial)

Course Aim:
Calculus III is a core Mathematics course that extends concepts and techniques developed in Calculus I and Calculus II to the case of functions of several real variables. In other words, we try to do the same things as in Calculus I and II, but in higher dimensions. In this course, we shall discuss the notions of limits, continuity, derivatives and integrals of real-valued and vector-valued functions of many variables. Most of the time, extending these familiar notions from one to several variables requires some degree of ingenuity, and we are going to have to spice up the material from Calculus I and II with a little bit of geometry and linear algebra. Techniques learned in Calculus III are essential for financial analysts, engineers, and for further study in mathematics.

Intended Learning Outcomes:
1. parametrise curves and their tangents;
2. approximate and optimise multivariate functions;
3. apply the chain rule to multivariate functions;
4. find volumes of geometrical objects in higher dimensions;
5. parametrise surfaces and their tangent planes;
6. recognise when it is appropriate to use cylindrical and spherical coordinates;
7. determine the div and curl of a vector field and recognise the physical interpretations of these quantities;
8. apply Stokes' theorem and its specialisations to simplify relevant problems;
9. apply multivariate calculus to real-world problems.

Course Content:

Reading and References:
James Stewart, Calculus (8th edition)

School of Physical and Mathematical Sciences
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