

**University of Moratuwa, Sri Lanka**  
**Faculty of Engineering**  
**Department of Mathematics**  
**B.Sc. Engineering Honours Degree**

**MA 2020 Calculus**  
**2 Credits**  
**Level 2 semester 1(2009)**  
**2 lecture Hours/Week**

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**Lecturer:** Ms. H.I.B.Soyasa  
**Subject Coordinator:** Mr.T.M.J.A.Cooray  
**Pre Requisites:** MA 101,102

**Learning Objectives:**

Upon completion of this subject, the students will have made substantial progress in:

1. Using the geometry of space: lines, planes, surfaces, and vectors in two and three dimensions to solve problems in mathematics and some elementary applications.
2. Using the calculus of real-valued functions whose domains are sets in one, two or three dimensions and being able to explain why some theorems from one dimensional calculus fail in two or three dimensions.
3. Applying the calculus of functions of several variables to a variety of elementary problems.

**Course Outline:**

**Vector Calculus**

Vector differentiation and differential operators, space curves and the line integral, surface and surface integrals and volume integrals. Divergence theorem, stroke's theorem, Greens theorem in plane. Some basic applications.

**Complex Variables**

Analytical functions and Cauchy-Reimann equation, Cauchy's integral formula and applications. Taylor and Laurent's series, contour integration. Introduction to conformal mapping.

**Assessment:**

End of semester examination: 2 hour paper(closed book): 70%  
Mid semester examination : 1 hour paper(closed book): 30%

**References:**

1. Complex Analysis with Vector Calculus by T.M.J.A.Cooray
2. Advanced Calculus –Schaum's outline Series