Faculty	Natural Sciences		
Home Department	Mathematics and Applied Mathematics		
Module Topic	Differential Calculus		
Generic Module Name	Mathematics 151		
Alpha-numeric Code	**MAM151**		
NQF Level	5		
NQF Credit Value	15		
Duration	Year		
Proposed semester to be offered	Both Semesters		
Programmes in which the module will be offered	BSc (Applied Geology) (3011); BSc (Chemical Sciences) (3019); BSc (Computer Science) (3023); BSc (Mathematical and Statistical Sciences) (3031); BSc (Physical Science) (3120)		
Year level	1		
Main outcomes:	On completion of this module students should be able to: • Have a firm understanding of how to use the basic properties of functions (composition, transformation, combinations, and graphs in different contexts) • Use mathematical induction to prove a statement involving a positive integer. • Understand and use the binomial theorem in various applications. • Use the concepts of limits, continuity and derivative with an emphasis on meanings in different mathematical contexts. • Use rates of change, relates rates and differentiation correctly in solving real-world problems.		
Main content:	• Sets, real numbers, Certesian coordinates, intro to proximity analysis. • Function, mapping diagram, limit, algebra of limit • Mathematical induction • Main types of functions that occur in calculus; transcendental functions [constant, power-law, polynomial, rational, radical, trigonometric, inverse trigonometric, exponential, hyperbolic trigonometric, logarithmic, combinations and compositions] • Binomial theorem and Pascal's triangle • Limits, continuity and the derivative of a function; existence theorems [mean value theorems for derivative, intermediate value theorem, extreme value theorem, Rolle's theorem] • Rules of differentiation rules and implicit differentiation. • Application of derivatives [curve sketching, polynomial approximations, indeterminate forms, l'Hopital's rule, local and global extrema, critical points, non-differentiability, related rates]. • Additional course-material will be covered, as compared with the corresponding mainstream module.		
Pre-requisite modules	None		
Co-requisite modules	None		
Prohibited module Combination	None		
Breakdown of Learning Time	**Hours**	**Timetable Requirement per week**	**Other teaching modes that does not require time-table**

Contact with lecturer / tutor:	39	*Lectures p.w.*	4	
Assignments & tasks:	18	*Practicals p.w.*	1	
Assessment:	12	*Tutorials p.w.*	0	
Practicals:	27			
Selfstudy:	54			
Other: Please specify	0			
Total Learning Time	**150**			
Methods of Student Assessment	Continuous Assessment (CA): 70% Final Assessment (FA): 30%			
Assessment Module type	Continuous and Final Assessment (CFA)			