

Faculty	Natural Sciences		
Home Department	Mathematics and Applied Mathematics		
Module Topic	Differential Equations and Numerical Methods		
Generic Module Name	Mathematics 212		
Alpha-numeric Code	MAT212		
NQF Level	6		
NQF Credit Value	20		
Duration	Semester		
Proposed semester to be offered	Second Semester		
Programmes in which the module will be offered	BSc (Mathematical and Statistical Sciences) (3227, 3031) BSc (Chemical Sciences) (3220, 3019) BSc (Physical Science) (3233, 3120) BSc (Computer Science) (3221, 3023)		
Year level	2		
Main outcomes:	<p>On completion of this module students should be able to:</p> <ul style="list-style-type: none"> • Formulate Differential Equations from given physical situations. • Solve linear Ordinary Differential Equations. • Interpret the solutions in the given physical context. • Solve linear systems of Differential Equations. • Use Newton's method to solve systems of nonlinear equations. • Use different methods for polynomial interpolation. • Use different methods for numerical differentiation and numerical integration with error estimates. 		
Main content:	<ul style="list-style-type: none"> • First-Order equations. • Homogeneous linear differential equations with constant coefficients. • Nonhomogeneous linear differential equations. • Numerical solutions of nonlinear algebraic equations. • Newton's method for systems of nonlinear equations. • Polynomial Interpolation. • Numerical differentiation and numerical integration. • Iterative methods for linear systems. 		
Pre-requisite modules	MAT105 or (MAT103 and MAT104) or (MAM151 and MAM152)		
Co-requisite modules	MAT211		
Prohibited module Combination	None		
Breakdown of Learning Time	Hours	Timetable Requirement per week	Other teaching modes that does not require time-table
<i>Contact with lecturer / tutor:</i>	39	<i>Lectures p.w.</i>	3
<i>Assignments & tasks:</i>	25	<i>Practicals p.w.</i>	2
<i>Assessment</i>	10	<i>Tutorials p.w.</i>	0
<i>Practicals:</i>	26		
<i>Selfstudy</i>	100		
<i>Other: Tutorials</i>	0		
Total Learning Time	200		
Methods of Student Assessment	Continuous Assessment (CA): 60% Final Assessment (FA): 40%		
Assessment Module type	Continuous and Final Assessment (CFA)		