

<b>Faculty</b>	Natural Sciences		
<b>Home Department</b>	Mathematics and Applied Mathematics		
<b>Module Topic</b>	Complex Analysis and Modern Algebra		
<b>Generic Module Name</b>	Complex Analysis and Modern Algebra 321		
<b>Alpha-numeric Code</b>	<b>MAT321</b>		
<b>NQF Level</b>	7		
<b>NQF Credit Value</b>	30		
<b>Duration</b>	Semester		
<b>Proposed semester to be offered</b>	Second Semester		
<b>Programmes in which the module will be offered</b>	BSc (Mathematical and Statistical Sciences (3227, 3031) BSc (Physical Science) (3233, 3120) BSc (Computer Science) (3221, 3023)		
<b>Year Level</b>	3		
<b>Main Outcomes</b>	<p>On completion of this module students should be able to:</p> <ul style="list-style-type: none"> <li>• Use properties of complex numbers and complex functions in problem solving.</li> <li>• Use the properties of analytic functions to solve problems.</li> <li>• Use contour integrals in various situations.</li> <li>• Use Taylor and Laurent series to solve problems</li> <li>• Use Residue theory to solve problems.</li> <li>• Generalize concepts from Groups to Rings.</li> <li>• Use different methods to test for irreducibility of polynomials.</li> <li>• Use the theory to construct finite fields.</li> <li>• Use their knowledge of field extensions to prove the impossibility of certain geometric constructions using ruler and compass.</li> </ul>		
<b>Main Content</b>	<p>Paper 1</p> <ul style="list-style-type: none"> <li>• Complex numbers and properties</li> <li>• Elementary complex functions and properties</li> <li>• Analytic functions</li> <li>• Contour integral and properties</li> <li>• Taylor and Laurent series</li> <li>• Residue theory</li> </ul> <p>Paper 2</p> <ul style="list-style-type: none"> <li>• Rings, subrings, integral domains, fields, field of quotients.</li> <li>• Quotient rings, prime ideals, maximal ideals.</li> <li>• Polynomial rings, factorization, irreducibility tests.</li> <li>• Field extensions.</li> <li>• Finite field construction.</li> <li>• Constructability by ruler and compass.</li> </ul>		
<b>Pre-requisite modules</b>	MAT211 and MAT221		
<b>Co-requisite modules</b>	None		
<b>Prohibited module Combination</b>	None		
<b>Breakdown of Learning Time</b>	<b>Hours</b>	<b>Time-table Requirement per week</b>	<b>Other teaching modes that does not require time-table</b>
<i>Contact with lecturer / tutor:</i>	39	Lectures p.w.	
<i>Assignments &amp; tasks:</i>	33	Practicals p.w.	3
<i>Practicals:</i>	30	Tutorials p.w.	
<i>Assessments:</i>	78		
<i>Self-study:</i>	120		

<i>Other: Tutorials</i>	0		
<b>Total learning time:</b>	<b>300</b>		
<b>Method of Student Assessment</b>	Continuous Assessment (CA): 50% Final Assessment (FA): 50%		
<b>Assessment Module Type</b>	Continuous and Final Assessment (CFA)		