

<b>Faculty</b>	Natural Sciences
<b>Home Department</b>	Computer Science
<b>Module Topic</b>	Algorithms and Architecture
<b>Generic Module Name</b>	Computer Science 212
<b>Alpha-numeric Code</b>	<b>CSC212</b>
<b>NQF Level</b>	6
<b>NQF Credit Value</b>	20
<b>Duration</b>	Semester
<b>Proposed semester to be offered</b>	Second Semester
<b>Programmes in which the module will be offered</b>	BSc (Computer Science) (3221, 3023) ); BSc (Mathematical & Statistical Sciences) (3227); BSc (Physical Science) (3233,3120)
<b>Year level</b>	2
<b>Main Outcomes</b>	<p>On completion of this module students should be able to:</p> <ul style="list-style-type: none"> <li>• Explain standard algorithmic methods, algorithm efficiency, algorithm complexity and the ability to apply these.</li> <li>• Explain the nature of computationally intractable problems and the role of heuristics.</li> <li>• Demonstrate improved analytical thinking and problem solving skills.</li> <li>• Explain the interaction between low- and high-level software and hardware and knowledge of the architecture of a typical RISK processor at the conventional machine level.</li> <li>• Explain the limitations and bottlenecks in modern processors and how hardware components and their interconnection affect the performance of a computer.</li> </ul>
<b>Main Content</b>	<p>Algorithms, and Complexity</p> <ul style="list-style-type: none"> <li>• Recursion, searches and traversal, divide and conquer, greedy algorithms, dynamic programming.</li> <li>• Program correctness; primitive recursive functions, mu-recursive functions, partial functions, Church-Turing thesis, time complexity of algorithms, average case complexity.</li> <li>• Classes P and NP, reducibility, NP-completeness, decidability, certificates.</li> <li>• Probabilistic algorithms.</li> </ul> <p>Architecture</p> <ul style="list-style-type: none"> <li>• System buses.</li> <li>• Internal memory and external storage.</li> <li>• Input/Output.</li> <li>• Instruction sets.</li> <li>• Operands and operations.</li> <li>• Addressing modes and formats.</li> <li>• Processor and register organization.</li> </ul>
<b>Pre-requisite modules</b>	None
<b>Co-requisite modules</b>	Computer Science - CSC211 or equivalent
<b>Prohibited module Combination</b>	None

<b>Breakdown of Learning Time</b>	<b>Hours</b>	<b>Timetable Requirement per week</b>		<b>Other teaching modes that does not require time-table</b>
<i>Contact with lecturer / tutor:</i>	42	<i>Lectures p.w.</i>	3	
<i>Assignments &amp; tasks:</i>	28	<i>Practicals p.w.</i>	6	
<i>Practicals:</i>	84	<i>Tutorials p.w.</i>	1	
<i>Tutorials:</i>	0			
<i>Tests &amp; Examinations:</i>	9			
<i>Selfstudy:</i>	37			
<i>Other:</i>	<b>0</b>			
<b>Total Learning Time</b>	<b>200</b>			
<b>Methods of Student Assessment</b>	Continuous Assessment (CA): 50% Final Assessment (FA): 50%			
<b>Assessment Module type</b>	Continuous and Final Assessment (CFA)			