Algorithmics

Units 3-4

For students who have completed Units 1 and 2 in Mathematical Methods, this subject provides the foundation for studying computer science and software engineering at tertiary level and some universities may offer accelerated pathways to students who have completed this study. The study also provides a conceptual framework for structured problem solving in STEM (Science, Technology, Engineering and Mathematics) and other disciplines that benefit from formal reasoning.

UNIT 3
In this unit, students focus on how algorithms are used for solving complex problems. Students will be involved in data modelling for abstract data types, design algorithms and apply algorithms to solve real world problems.

LEARNING ACTIVITIES
In this subject, student will be analysing algorithms and writing about their impact on the real world problems they attempt to solve or influence through the design of the algorithm.

KEY SKILLS REQUIRED
Problem solving skills, high level analytical skills, idenitfy, write and correct errors in pseudocode, represent complex information as abstract data types (ADT's), implement algorithms as computer programs in very high level programming language.

ASSESSED TASKS
A folio, a written report and a project (15%)

UNIT 4
In this unit, students focus on the performance of algorithms. Students develop the knowledge and skills to identify the resources that an algorithm needs to function efficiently and effectively.

LEARNING ACTIVITIES
In this unit students will concentrate on the design of the algorithm and how it can best solve a real world problem.

KEY SKILLS REQUIRED
Problem solving skills, high level analytical skills, comparing algorithms based on complexity, recognise and apply the divide and conquer, backtracking and dynamic programming design patterns.

ASSESSED TASKS
A written report, a design of an algorithm, an oral or visual presentation (15%) and an end of year examination (60%)