

# Algorithmics

## Units 3-4

**This subject is completed at the Centre for Higher Education Studies (CHES). An application process is required. Please see the Mathematics Learning Area Leader if committed.**

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, identify, 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

Combination of a range of SAC tasks (12%), and the start of the SAT task.

### 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

Continuation of the SAT task, and an application SAC task (8%)

**VCAA ASSESSMENT** - The overall study score will consist of  
School Assessed Coursework (20%)  
School Assessed Task (20%)  
End of year examination (60%)