



This handbook is designed for students, families and key school staff. It provides a summary of the CHES VCE programs, the application process and the expectations and requirements of studying a VCE subject at CHES.



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## Welcome to CHES

### Centre for Higher Education Studies (CHES)

Welcome to the next stage in your educational journey. At CHES we specialise in four highly regarded VCE studies of great appeal to high-ability senior students:

- VCE Algorithmics (Units 3 & 4)
- VCE Extended Investigation (Units 3 & 4)
- VCE English Language (Units 1 – 4)
- VCE Specialist Maths (Units 1 – 4)

CHES is a ground-breaking centre of excellence that has been established to cultivate the potential of high-ability and high-achieving senior secondary school students. It is a direct response to the Victorian Government's intention that all students, regardless of their starting point, are supported to realise their full potential.

At CHES we offer select VCE subjects to government school students across Victoria, including students in metropolitan, rural, regional, and remote areas and those from disadvantaged backgrounds. We're excited to be expanding access to these important VCE studies to an even more diverse group of high-achieving students than ever before. Through an innovative 'hy-flex' approach to teaching and learning, students remain enrolled at their chosen government secondary school and undertake a VCE study through CHES, as a part of their overall VCE program. To accommodate as many eligible students as possible, these programs are available through a hybrid and flexible approach, with opportunities to study online, on-site at CHES or a combination of the two.

Our programs enable students to accelerate and deepen their learning. Students enrolled in one of our subjects have the opportunity to forge a strong foundation for future university study, expand their knowledge and skills, challenge themselves, build networks with other high-achieving students, and continue building an impressive CV for the future while completing their VCE. Students who undertake a VCE subject at CHES will also have access to our CHES Student Enrichment Series, which includes exclusive masterclasses and events with a range of universities.

At CHES we are forward thinking. We invite you to look to the future with us.

This handbook details the process and timeline for applying for a VCE subject at CHES and there is a simple online written application available through the CHES website: [www.ches.vic.edu.au](http://www.ches.vic.edu.au).

I encourage you to read the information in this handbook, on our website, and to contact us with any questions or queries you may have. To learn more about studying a VCE subject at CHES, we welcome you to attend one of our online information evenings. See our website [www.ches.vic.edu.au](http://www.ches.vic.edu.au) for registration details. For further advice, contact us at email: [ches@education.vic.gov.au](mailto:ches@education.vic.gov.au) and phone 9063 1170.

We warmly welcome your application to enrol in a VCE subject with us in 2024.

**Stewart Milner**

Foundation Principal

**We Reach; We Connect; We Understand.  
We Think Ahead.**

[www.ches.vic.edu.au](http://www.ches.vic.edu.au)



## Application Process

### Studying a VCE Subject at CHES

Our cornerstone belief at CHES is that high-ability students across Victoria can flourish and realise their potential through the opportunities we offer to extend, deepen and accelerate their learning. The CHES VCE subjects are designed to complement the subjects you will be completing at your current school.

#### How do I apply to enrol in a VCE subject through CHES?

Students apply via a simple online application form available via the CHES website: [www.ches.vic.edu.au](http://www.ches.vic.edu.au)

The student application includes two parts: one section to be completed by you and your parent/ carer and another by your school. Your school Principal will be asked to share some of your academic data, a statement that confirms your suitability for a CHES program and any special or extenuating circumstances. Your application must be **approved by your Principal**.

CHES will consider a range of information when selecting students for its VCE programs. As part of your application you'll be asked to provide a statement that outlines your desire to study at CHES and reflects your interest and suitability for the program.

Students are not required to take an entrance exam to enrol in a VCE subject at CHES.

#### Are there subject prerequisites?

There are no subject prerequisites for VCE Extended Investigation Units 3 & 4. It is expected that you will possess the capacity or potential to develop critical thinking and independent research skills and have good literacy skills.

The only prerequisite for VCE Algorithmics Units 3 & 4 is that you must have successfully completed VCE Mathematical Methods Units 1 & 2 or be studying it concurrently whilst you study Algorithmics. **As a HESS subject it is important that students are aware that this subject covers content found in first year university courses and may provide a higher degree of challenge.** It is also expected that you will have the capacity or potential for developing strong problem-solving skills.

There are no prerequisites for entry to English Language Units 1 & 2. It is **strongly recommended** that students have completed Units 1 & 2 prior to commencing Units 3 & 4. Students are **strongly encouraged** to only enrol in English Language through CHES if they are completing another English subject (English or Literature) in their base school. Students will only be permitted to enrol in English Language at CHES with the full support of their base school.

Students completing Units 1&2 Specialist Mathematics must be completing concurrently, or will have already completed, Units 1&2 Mathematical Methods. Students completing Units 3 & 4 Specialist Mathematics must be completing concurrently, or will have already completed, Units 3 & 4 Mathematical Methods. It is **strongly recommended** students complete Units 1 & 2 Specialist Mathematics before commencing Units 3 & 4. Students will only be permitted to enrol in Specialist Mathematics at CHES if the subject is not offered or run in their base school.

#### Are students from non-government schools eligible to apply?

For students to be considered for a CHES program (HES or a VCE subject) current enrolment in a government school is required. Where a student may already have a dual enrolment that reaches across the government, catholic or independent school sectors, the student must be undertaking the majority of their studies at the government school. (For example, if a student is currently enrolled in an independent school where the majority of their VCE studies are being completed but is also undertaking a subject through Virtual School Victoria or the Victorian School of Languages, this student would not be considered eligible for participation in a CHES program).

Students must **maintain their enrolment in a Victorian government school** (as their main school) for the duration of their course at CHES. Students who do not maintain their enrolment in a Victorian government school may be ineligible to continue their studies, or payment may be sought to fund their participation. The CHES principal will determine the most suitable approach in such a situation.

**International students and students who are home-schooled are not eligible to enrol at this time.**



### Can I apply for more than one VCE subject at CHES?

You will not be restricted from participating in more than one CHES subject per year, however, it is **not advised**. Separate applications will be required for each VCE subject and each application will be assessed on a case-by-case basis.

### If I enrol in a VCE subject through CHES, can I also apply to study a HES?

It is not recommended that you study a VCE subject as well as a Higher Education Study (HES) through CHES **in the same year**. However, we anticipate that many students will choose to study a VCE subject at CHES in Year 11 and then apply for a Higher Education Study (HES) in Year 12. Algorithmics is a Higher Education Scored Study (HESS) so studying that subject in Year 11 will not impact on your capacity to study a Higher Education Study (HES) in Year 12. You can study Algorithmics (HESS) and a Higher Education Study (HES) and have **both subjects** contribute towards the calculation of your final ATAR.

### How will my application be assessed?

The allocation of student places to our VCE studies will be based on merit with consideration to the principles of excellence and equity. An enrolment committee convened by the CHES Principal will assess each application. There is no limit on the number of applications that can be received, nor the number of students that can be enrolled at CHES, from any one school. Every application will be given equal consideration.

### When are CHES classes held?

VCE subjects will be taught by CHES teachers. The timetable will be confirmed at the start of the school year in consultation with the students. Classes will be held both during and outside normal school hours to minimise clashes with your other VCE classes. Our hy-flex approach to scheduling and delivery of sessions ensures we are able to accommodate as many high-achieving students as possible from across the State. Students will attend at least one live lesson and one tutorial each week.

### What is the time commitment? What are the attendance requirements?

The time requirements for CHES VCE subjects are equivalent to the time allocation for other VCE subjects. It is important to note that for our VCE subjects, you will be required to maintain a minimum of 90% attendance of scheduled classes to gain satisfactory completion. You may choose to attend onsite, virtually, or a combination of both. Only approved absences and approved school activities (sports, excursions etc.) will be considered as legitimate absences for meeting the minimum of 90% attendance rule. For students participating virtually, the 90% attendance requirement also applies.

When you are undertaking CHES programs remotely, you'll need to ensure that you have suitable camera and microphone technology so that your teacher can verify your attendance and so that you can engage fully in our classes.

### Can I enrol in a CHES subject in Year 9 or 10 or earlier?

CHES VCE courses are designed for senior secondary students (i.e. Year 11 or Year 12 students). Applications to undertake a CHES course from students in Year 10 or below will only be considered for exceptional circumstances on a case-by-case basis.

### How can I find out more?

Please visit our website for more information and to register for updates [www.ches.vic.edu.au](http://www.ches.vic.edu.au)



## Application timeline for VCE subjects at CHES

### Key Dates for Enrolment in a VCE Study at CHES

Date	
<b>Tuesday 13 June 2023</b>	Applications open for 2023 VCE subjects
<b>Tuesday 20 June 2023 (6.30pm)</b>	*VCE Information Evening (online) Session 1
<b>Thursday 13 July 2023 (6.30pm)</b>	*VCE Information Evening (online and in person) Session 2 (this is a repeat of Session 1)
<b>Thursday 31 August 2023 (11.59pm)</b>	Applications close for 2024 program (late applications will not be accepted)
<b>Tuesday 31 October 2023</b>	Outcomes of applications emailed to student applicants and their schools. For students who receive an offer of acceptance, CHES will provide the full enrolment pack for studying at CHES in 2024.
<b>Monday 4 December - Wednesday 6 December 2023</b>	Orientation program for all CHES students
<b>Early February 2024</b>	VCE classes at CHES commence.

\*We will hold information evenings for students and families to find out more about undertaking a VCE subject at CHES on two separate occasions. It is not necessary to attend both information evenings. Registrations for the information evenings will be available through the CHES website. A recording of the information evening will also be available on the CHES website.



## Steps to apply for a VCE Study at CHES

### 1. Choose one of our VCE subjects

In choosing a subject to apply for, we encourage you to consider your strengths, interests and future career aspirations first and foremost. Two key things to keep in mind are:

- The VCE subjects you most enjoy and achieve most highly in
- The prerequisites and any other requirements for enrolment into CHES

### 2. Discuss with your school and seek their support

The Principal of your school will need to approve your application to study a VCE subject through CHES and you will also need your parent/carers support.

### 3. Apply online through the CHES website

Once you have confirmed that you are eligible and have support to enrol in a VCE subject at CHES, you will need to submit an online application through the CHES website: [www.ches.vic.edu.au](http://www.ches.vic.edu.au)

To submit an application follow the steps on the CHES enrolment application page. Choose your preferred VCE subject and complete the Student Statement section.

### Students will be asked prepare a short response to the following questions as a part of the application:

1. For students applying for Algorithmics: Please outline what it is about Algorithmics that appeals to you and what you hope to learn, understand or be able to do, and why, with this knowledge.
2. For students applying for English Language: Please outline your reasons for your interest in completing English Language, including whether you will be studying another English subject (English or Literature) at your base school while studying English Language.
3. For students applying for Extended Investigation:

Studying at CHES allows students to undertake research connected to an area or topic of particular interest. Please provide a description of your area of interest and what you would hope to more fully understand about this area through further research and investigation. Please note that you do not need to commit to undertaking your Extended Investigation on this topic at this time.

4. For students applying for Specialist Maths: Please outline your reasons for your interest in completing Specialist Maths, including whether your school offers the subject at either Unit 1 & 2 or Unit 3 & 4 level.
5. Please outline your motivation to undertake a VCE course through CHES.

You will also be given the opportunity to outline any extenuating circumstances or other considerations CHES should be aware of when assessing your application. All responses are limited to 300 words.

While preparing your application, you can click the 'Save' button at any time and return to your application later. Once you have successfully submitted your online application, you'll receive an automatic email confirming receipt of your online application.

As part of the selection process, we will also seek information about your achievements at school, including your most recent school report. Your school will be asked to provide a statement that confirms your suitability. Once you have completed and submitted your section of the application, a request will automatically be sent to your Principal to have them (or a representative) complete the relevant section of the application. Please note that all completed applications must be received by CHES at **11.59pm on 31 August 2023**. You are encouraged to **confirm that your school has received the application** and will be able to submit this by the deadline.



### The benefits of studying a VCE subject with CHES

CHES is specialising in the delivery of selected VCE subjects as well as Higher Education Studies (first year university subjects) for high-achieving senior students across Victoria.

There are many benefits to studying a VCE subject at CHES.

#### Excellent preparation for future university studies

All VCE subjects provide excellent preparation for subsequent university studies, especially in terms of the research, critical thinking and analytical skills developed in those subjects.

#### Student Enrichment Series

At CHES we recognise the importance of supporting students with their transition to university. Together with our university partners, CHES provides enrichment and extension opportunities to further stretch and challenge senior students through our CHES Student Enrichment Series.

Our Student Enrichment Series will include masterclasses, workshops and seminars and is also intended to enrich and extend the critical thinking, creativity, collaboration and communication skills of students.

#### Excellent preparation for the emerging hybrid and flexible world

While remaining enrolled at their chosen government secondary school, students are able to undertake a study at CHES as part of their VCE program. To help students fit their CHES subject in with their overall VCE program, we deliver our VCE programs in hybrid and flexible ways. This way of learning provides an excellent grounding for students in the adaptive ways of working in the kinds of professional organisations they may seek careers with into the future.

This 'hy-flex' approach to teaching and learning means that we deliver our VCE subjects on site at our state-of-the-art CHES facility and online through our innovative virtual learning environment. Our provision of VCE subjects is mediated through the extensive technology installed and embedded within the CHES facility and this ensures that regardless of whether students are participating on-site or online, they can have an equitable, high-quality learning experience.







### Ongoing support and guidance from CHES

We provide wrap-around support to enable students to be as successful as possible during their journey with CHES. Our staff liaise closely with the base-schools of students to support their academic progress, wellbeing and engagement, including those who are learning remotely.

### Opportunities to make new friends and connections

Students learn together with other high-ability students from across Victoria. They have the opportunity to build positive relationships with like-minded peers and build a strong network before continuing to university after graduating from secondary school.

### Access to a range of CHES resources

All students accepted into CHES are provided access to the CHES Learning Management System (LMS). This will provide students with a common platform for access to curriculum, learning activities, assessment tasks, collaboration spaces, attendance data, news and key information updates, links to services and staff at the CHES and booking options for the Student Enrichment Series.

### Adding credentials to your CV

Students enrolled in a VCE subject with us have the opportunity to receive achievement awards through CHES, as well as student leadership opportunities including nomination for election to the CHES school council.

### Student educational resources

Students will be advised if they need to acquire VCE study textbooks (paper or digital versions), stationery, calculators, and digital devices.

## Teaching and Learning Framework

**At CHES we aim to extend, accelerate and deepen learning.**

We aim to challenge and support high-ability students by:

- accelerating access to subjects in the senior secondary years;
- deepening learning through personalisation—including empowering students to independently explore and research topics of interest;
- expanding access to selected VCE subjects to enable deeper learning and exploration of important topics and strengthen the capacity of students to solve complex problems;
- making **Higher Education Studies** accessible to students across Victoria.

Through our programs, we provide opportunities for students to develop these important life-long capabilities:

- **Learning skills:** critical thinking, creativity, collaboration, communication
- **Literacy skills:** information, media, technology
- **Life skills:** flexibility, leadership, initiative, productivity, social skills

The teaching and learning framework at CHES is based on the High Impact Teaching Strategies (HITS), the Victorian Teaching & Learning Model, and the principles of hy-flex instruction and delivery.



## Assessment and Reporting at CHES

For all VCE studies, students will complete a range of learning activities and assessments, including school based assessment and/or Unit 3 and 4 external assessment.

### Individual Achievement Plans

Once enrolled in a VCE subject with CHES we will strive to know each student through the establishment of an Individual Achievement Plan to support a successful transition, and this includes:

- student goals and ambitions
- timetable schedule
- study arrangements (CHES program and delivery mode: face to face, virtual, or combination)
- travel arrangements (if applicable)
- agreed communication methods between student, base-school, and CHES (who, what, when and how)
- reasonable adjustments to meet the learning and wellbeing needs of students

## Reports

Students and parents/carers will be provided with access to an online report in Term 1, 2 and 3. These reports will provide feedback on a student's learning performance for their VCE subject at CHES in terms of effective learning skills and study habits.

VCAA will provide a Statement of Results at the end of the school year.

### Parent-Student-Teacher (PST) Conferences:

Students and parents/carers will have the opportunity to attend an online PST Conference in Term 2 and 3 for their VCE subject with CHES. These conferences will take place after the reports have been provided to students and parents/carers.

## Questions?

### We welcome your enquiries

If you have any questions about studying VCE at CHES, please contact the CHES team on [ches@education.vic.gov.au](mailto:ches@education.vic.gov.au)

The CHES website should be consulted regularly by students, parents and carers and their schools to ensure that they are accessing the most up-to-date information on HES through CHES.

**We warmly welcome your application to enrol in a VCE subject through CHES in 2024.**

For further advice please visit the school website [www.ches.vic.edu.au](http://www.ches.vic.edu.au) or contact CHES via email: [ches@education.vic.gov.au](mailto:ches@education.vic.gov.au)



## VCE studies offered at CHES in 2024

The Centre for Higher Education Studies (CHES) offers selected VCE subjects for high-achieving and high-ability students in Victorian government schools. These subjects are highly regarded and typically have great appeal for high-ability students.

### Algorithmics Units 3 & 4

#### Introduction

Algorithmics is a 'Higher Education Scored Study', which means that it is designed to be the equivalent of a first-year university subject. Students can attain a VCE study score for Algorithmics and some universities offer accelerated pathways and credits for successful completion.

Algorithmics provides a structured framework for solving real-world, practical problems with computational methods. It is fundamental to computer science and software engineering and is essential for understanding the technical underpinnings of our information society. Further, it provides a methodical way to approach complex problem-solving in STEM (Science, Technology, Engineering and Mathematics) and other disciplines that benefit from analytical problem-solving and formal reasoning. Computing is central to our society and economy and drives innovation across many fields of human endeavour.

Algorithmics examines how information about the world can be systematically represented and how the processes can be made precise enough to be implemented in a computer program. The focus is not on coding but on 'algorithmic thinking'. Algorithmics covers systematic methods for analysing real-world problems and identifying the key aspects that need to be modelled to find a solution.

Algorithmics also covers deeper topics in computer science such as artificial intelligence, statistical methods of computation, and ethical issues related to these topics. This investigation of theoretical topics is complemented by the development of skills in a high-level programming language.

#### Structure

The study is made up of two units which must be taken in a sequence:

Unit 3: Algorithmic problem-solving

Unit 4: Principles of algorithmics

#### Prerequisites

There are no Algorithmics Units 1 & 2; there is only the Units 3 & 4 sequence. Students must be currently enrolled in or have already successfully completed **VCE Mathematical Methods Units 1 and 2** in order to enrol in VCE Algorithmics Unit 3. Students can apply to study Algorithmics in Year 11 or Year 12.

#### Course content

Unit 3: Algorithmic problem-solving

This unit focuses on how algorithms are used for solving complex problems.

Area of Study 1

students develop and apply a range of knowledge and skills in data abstraction.

Area of Study 2

students learn how formalise processes as algorithms and execute them automatically.

Area of Study 3

students combine their knowledge of data modelling and algorithm design to solve real-world problems.

Unit 4: The principles of algorithms

This unit focuses on the performance of algorithms and the scope and limitations of algorithms.

Area of Study 1

students study the efficiency of algorithms using mathematical techniques.

Area of Study 2

students learn to solve a variety of information problems using algorithmic design patterns.

Area of Study 3

students examine the emergence of computer science as a field and the philosophical and technical ideas that support modern AI.

#### Pathways

Algorithmics provides students with an understanding of skills necessary to succeed in careers that involve Computer Science and Software Engineering.

Students can explore solutions to a range of real-world problems, including complex systems and the interactions between variables in those systems.



## English Language Units 1 – 4

English Language explores the ways in which language is used by individuals and groups and how it reflects our thinking and values. By learning about how we shape and can be shaped by our use of language, we can develop deeper understandings about ourselves, those who surround us and the society in which we live. These understandings enhance the skills for effective communication in all contexts.

English Language is informed by the discipline of linguistics and draws on a set of metalinguistic tools to understand and analyse language use, variation and change. The study of English Language reveals the structures, features and discourses of written and spoken texts through the systematic and evidence-based construction and deconstruction of language in use.

### Structure

This study is made up of four units. Units 3 & 4 must be taken as a sequence. It is strongly recommended that Units 1 & 2 are completed before commencing Units 3 & 4.

Unit 1: Language and communication

Unit 2: Language change

Unit 3: Language variation and purpose

Unit 4: Language variation and identity

### Prerequisites

There are no prerequisites for entry to Units 1 & 2. It is strongly recommended that students have completed Units 1 & 2 prior to commencing Units 3 & 4.

Students are strongly encouraged to only enrol in English Language through CHES if they are completing another English subject (English or Literature) in their base school. Students will only be permitted to enrol in English Language at CHES with the full support of their base school.

### Course content

Unit 1: Language and communication

This unit focuses on the nature of language as a system of signs and conventions

Area of Study 1

students identify and describe primary aspects of the nature and functions of human language

Area of Study 2

students identify, describe and investigate types of language acquisition in the context of linguistic theories

Unit 2: Language change

This unit focuses on explore texts and consider how language changes affects the subsystems of language.

Area of Study 1

Students identify and describe the effects of language change on the English language.

Area of Study 2

Students identify and explain the effects of the global spread of English through spoken and written texts.

Unit 3: Language variation and purpose

Area of Study 1

Students identify, describe and analyse features of informal language in written and spoken texts.

Area of Study 2

Students identify, describe and analyse features of formal language in written and spoken texts.

Unit 4: Language variation and identity

Area of Study 1

Students identify, describe and analyse varieties of English in Australian society, attitudes towards them and the identities they reflect.

Area of Study 2

Students identify, describe and analyse how variation in language, linguistic repertoires and language choice reflects and conveys people's identities.

### Pathways

The study of VCE English Language enables students to further develop and refine their skills in reading, writing, speaking and listening to English. Proficiency in analysing and assessing language use and improves effective communication. Through the exploration of language use, students gain insight into the experiences of others, develop empathy and compassion, and are able to engage in active citizenship.

Knowledge of how language functions provides a useful basis for further study or employment in numerous fields such as arts, sciences, law, politics, trades and education. The study supports language-related fields such as psychology, the study of other languages, speech and reading therapy, journalism and philosophy. It also supports study and employment in other communication-related fields, including designing information and communications technology solutions or programs.



## Extended Investigation Units 3 & 4

### Introduction

Extended Investigation enables students to develop, refine and extend knowledge and skills in independent research and to carry out an investigation that focuses on a rigorous research question. The investigation may be an extension of an area of curriculum already studied or it may be completely independent of any other subject in the student's VCE program.

Through this subject, students develop their capacity to explore, justify and defend their research findings in both oral and written forms to an educated non-specialist audience. Students develop and construct a research question, explore and apply ethical and robust research methods and conduct a review of relevant literature. They will develop skills in research project management and rigorously analyse findings and results. They will present both written and oral results of research findings and develop as independent, critical and reflective learners.

Aspects of critical thinking such as analysing, evaluating and synthesising information and reasoning logically are integral to the process of formulating and developing an investigation. As well as critiquing the strengths and the weaknesses of the arguments and conclusions of other researchers, students also need to apply critical thinking to their research question, methodology and research findings.

### Structure

The study is comprised of a Unit 3 and 4 sequence:

Unit 3: Designing an extended investigation

Unit 4: Presenting an extended investigation

### Prerequisites

There are no Extended Investigation Units 1 & 2; there is only the Units 3 & 4 sequence. There are no prerequisite subjects for studying Extended Investigation Unit 3. Students can apply to study Extended Investigation in Year 11 or Year 12. Strong literacy skills are required to access and utilize academic resources and writing conventions.

### Course content

Unit 3: Designing an extended investigation

In this unit students develop skills in question construction and design, explore the nature and purpose of research and research methodologies, critically review research literature, and identify a specific research question.

#### Area of Study 1

Students devise a research question that is of significance and requires a detailed inquiry.

#### Area of Study 2

Students learn about the practical components of planning and undertaking research, methods of research and principles of project management.

#### Area of Study 3

Students develop and apply the skills of critical thinking, including considering how arguments are constructed.

Unit 4: Presenting an extended investigation

This unit is comprised of two parts that together constitute the student's completion of their investigation. The results of the investigation are presented in a final written report and in an oral presentation.

#### Area of Study 1

Students complete their investigation and write the final report that provides their response to the research question for an education, non-specialist audience.

#### Area of Study 2

Students explain their investigation, critically evaluate their research process and defend their findings in a presentation to an educated, non-specialist audience.

### Pathways

The skills that students develop in Extended Investigation are transferable to any higher education course or vocational education and training program.



## Specialist Mathematics Units 1 – 4

Mathematics is the study of function and pattern in number, logic, space and structure, and of randomness, chance, variability, and uncertainty in data and events. It is both a framework for thinking and a means of symbolic communication that is powerful, logical, concise and precise. Mathematics also provides a means by which people can understand and manage human and natural aspects of the world and interrelationships between these. Essential mathematical activities include conjecturing, hypothesising and problem-posing; estimating, calculating, computing and constructing; abstracting, proving, refuting and inferring; applying, investigating, modelling and problem-solving.

Specialist Mathematics Units 1–4 provide for the study of various mathematical structures, reasoning and proof. The areas of study in Units 3 and 4 extend content from Mathematical Methods Units 3 and 4 to include rational and other quotient functions as well as other advanced mathematics topics such as logic and proof, complex numbers, vectors, differential equations, kinematics, and statistical inference. They also provide background for advanced studies in mathematics and other STEM fields. Study of Specialist Mathematics Units 3 and 4 assumes concurrent study or previous completion of Mathematical Methods Units 3 and 4.

### Structure

This study is made up of four units. Students undertaking Specialist Mathematics must also complete the equivalent units of Mathematical Methods, either concurrently or in the year prior to commencing study.

**Unit 1:** Algebra, number and structure, Discrete mathematics and Mathematical investigation

**Unit 2:** Data analysis, probability and statistics, Space and Measurement, Algebra, number and structure, Functions, relations and graphs and Mathematical investigation

**Units 3 & 4:** Discrete mathematics, Functions, relations and graphs, Algebra, number and structure, Calculus, Space and measurement, Data analysis, probability and statistics

### Prerequisites

Students completing Units 1&2 Specialist Mathematics must be completing concurrently, or will have already completed, Units 1 & 2 Mathematical Methods.

Students completing Units 3&4 Specialist Mathematics must be completing concurrently, or will have already completed, Units 3 & 4 Mathematical Methods.

It is strongly recommended students complete Units 1 & 2 Specialist Mathematics before commencing Units 3 & 4.

Students will only be permitted to enrol in Specialist Mathematics at CHES if the subject is not offered or run in their base school.

### Course Content

On the completion of each unit students will be required to demonstrate achievement in outcomes that encompass all areas of study in the unit.

#### Outcome 1

Students are able to define and explain key concepts and apply a range of related mathematical routines and procedures

#### Outcome 2

Students are able to apply mathematical processes in non-routine contexts, including situations with some open-ended aspects, and analyse and discuss these applications of mathematics

#### Outcome 3

Students are able to apply computational thinking and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis.

### Pathways

Specialist Mathematics provides a background for further study in mathematics, science, engineering, commerce and information technology.