



THOMAS CARR
COLLEGE
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YEAR 12 CURRICULUM INFORMATION



INTRODUCTION

Thomas Carr College is committed to providing an engaging and innovative learning environment and developing in students independent thinking and informed decision-making. Year 12 is the culmination of secondary school and more importantly, the final year as a student at Thomas Carr College. Most students at Year 12 will continue on from their unit 2 studies. The most desirable pathway into Unit 3 subjects is to have experienced the subjects in Units 1 and 2. From time to time, a minimal number of students select a Unit 3/4 sequence without having completed Units 1 and 2. Priority is given to students who are continuing their subject sequence from Year 11.

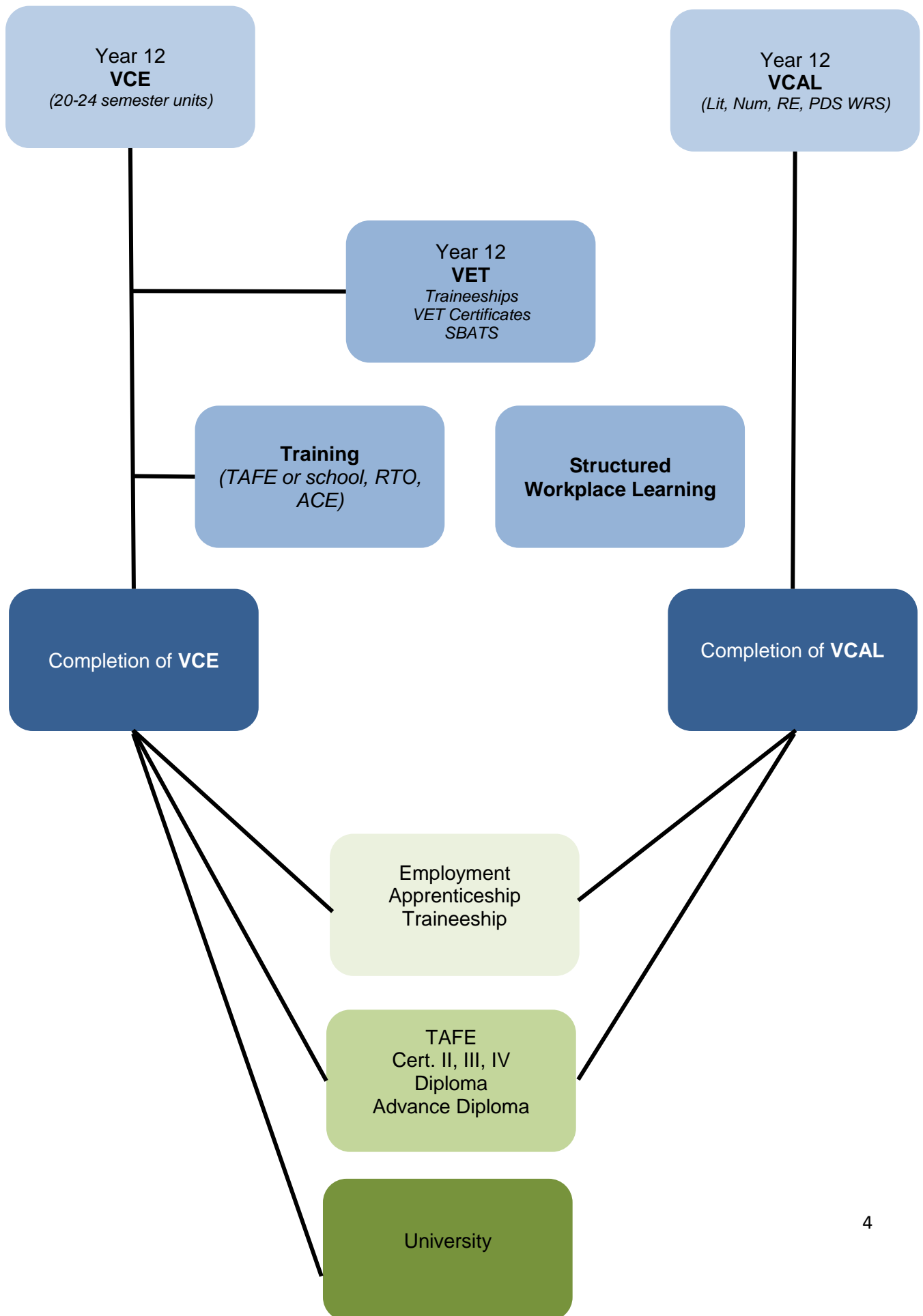
Serious consideration must be undertaken before undertaking a Unit 3/4 subject for the first time and must be made in consultation with the subject teacher, Careers Advisor, Head of Learning and Teaching Senior School, Director of Learning and Teaching and Director of Operations.

This document provides information for students who are beginning Year 12, subject offerings and important contact information. Comprehensive curriculum pathways are available on our College website and through SIMON.

Each year, every effort is made to meet the subject selection preferences for the maximum number of students. Some of the options listed may not be offered due to insufficient student demand.

Students are encouraged to seek the advice of Ms De Silva and Ms Le Noel (VET/VCAL) as well as subject teachers in order to make considered decisions about possible learning pathways. Each year it is problematic for students who have chosen subjects not suited to interest or ability. VCE units are offered in sequence and the best possible pathway to success is to firstly choose correctly and then to complete the units sequentially.

PATHWAYS



COURSE OF STUDY

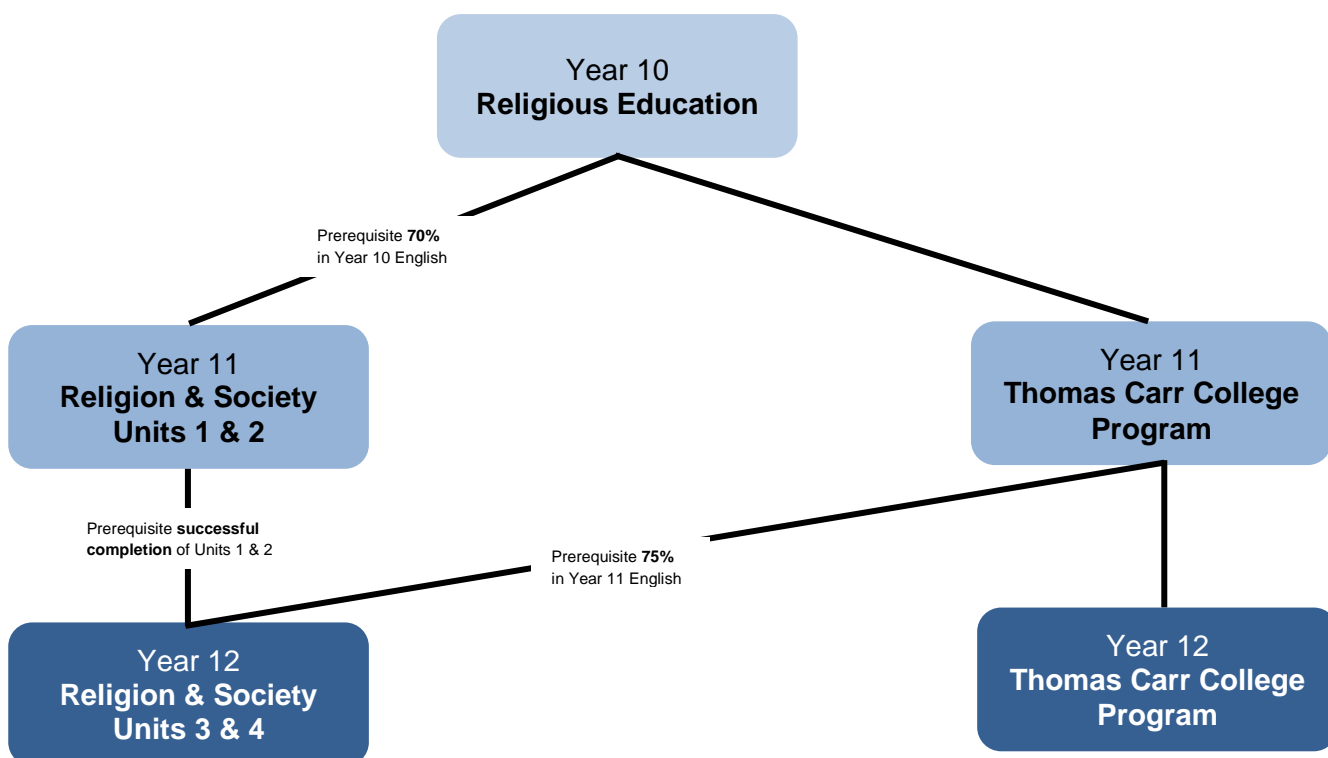
At Year 12 students complete five VCE subjects. Students must continue with their English learning pathways. Students can select to undertake a VCE Religious Education subject, Religion and Society instead of the Thomas Carr College Religious Education program. It is desirable that students have completed Units 1 and 2 of a VCE Religious Education subject in Year 11.

VCAL students will normally continue their VCAL subjects into Year 12.

Information for students about Religious Education, English and Mathematics Pathways can be found below.

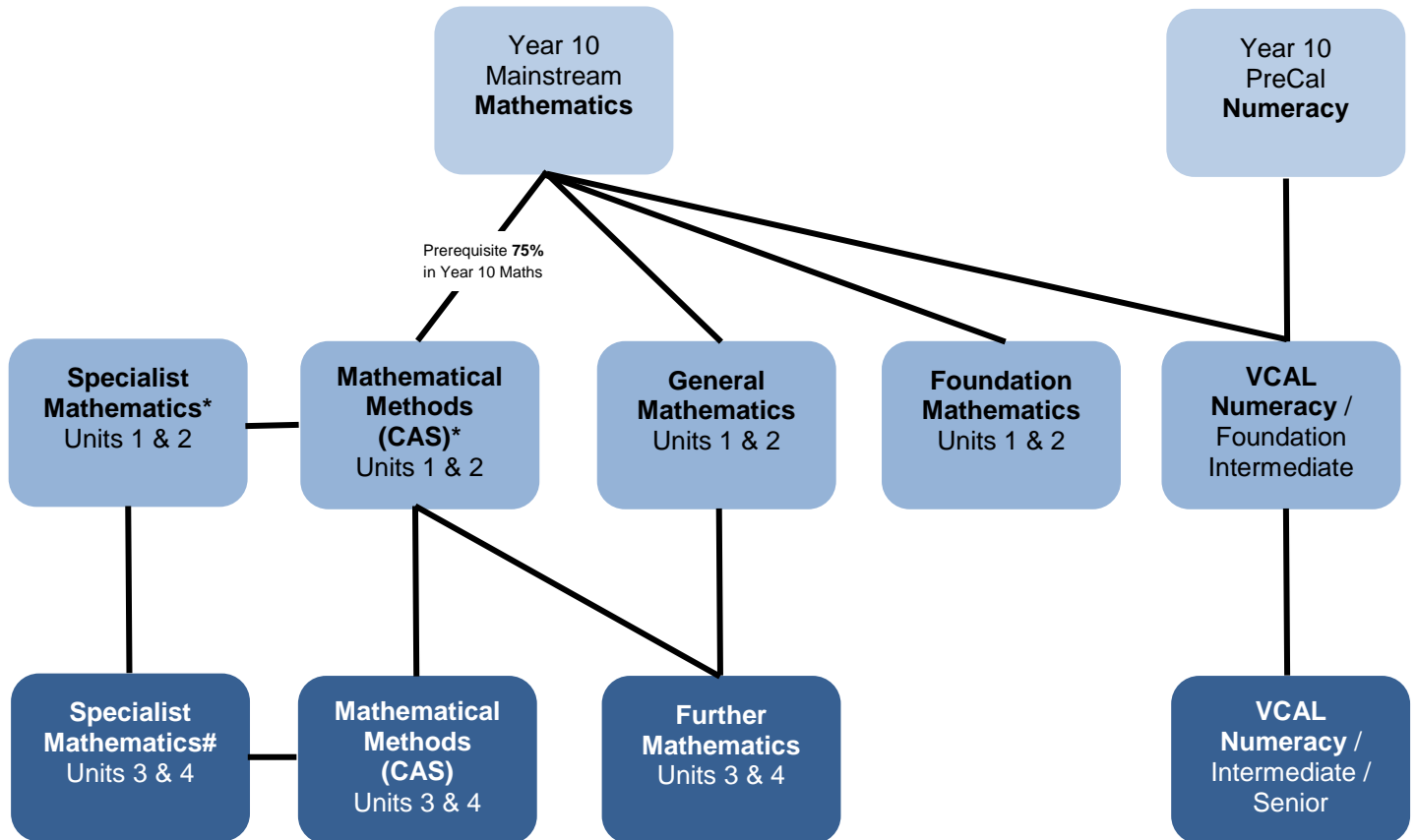
RELIGIOUS EDUCATION PATHWAYS

All students at Thomas Carr complete studies in Religious Education. If you wish to study VCE Religion and Society Units 3 & 4 at Year 12, you must either complete VCE Religion and Society Units 1 & 2 to a satisfactory standard or achieve an average of at least 75% in your Year 11 English assessments and exam.



MATHEMATICS PATHWAYS

The following diagram shows the pathways of your mathematical choices from Years 10 through to VCE. It is very important that you talk to your Maths teacher in order to make choices with which you are comfortable and with which you can be challenged to be successful. If you wish to study Specialist Maths at Year 12, it is highly recommended that you choose Specialist Mathematics Units 1/2 and Mathematical Methods (CAS) Units 1/2 at Year 11.

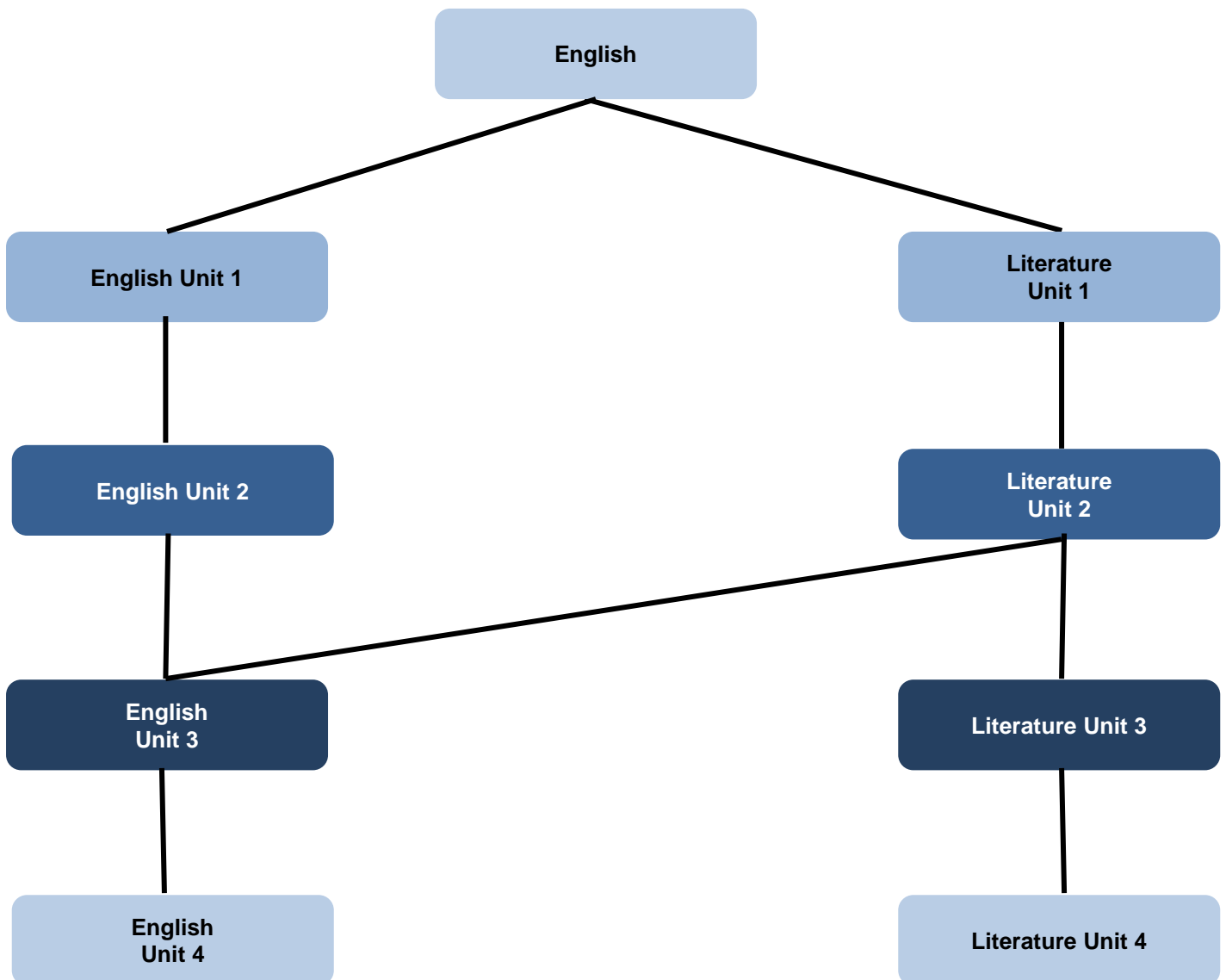


*Specialist Mathematics Units 1 & 2 **must** be studied with Mathematical Methods (CAS) Units 1 & 2 before advancing to Specialist Mathematics Units 3 & 4

#Specialist Mathematics Units 3 & 4 **must** be studied with Mathematical Methods Units 3 & 4

ENGLISH PATHWAYS

English learning pathways follow a particular structure that allows students to choose either English and/or English Literature. At the completion of English Literature Unit 2, a student can transfer to English Unit 3. It is very important that you talk to your English/English Literature teacher in order to make choices with which you are comfortable and with which you can be challenged to be successful.



UNITS 3 & 4 SUBJECTS

Subjects	
Accounting	Indonesian Second Language
ACU Step Up <i>*please see pp.8-10</i>	Italian Second Language
Agricultural and Horticultural Studies	Information Technology Applications
Art	Japanese Second Language
Biology	Legal Studies
Business Management	Literature
Chemistry	Mathematical Methods
English	Music Performance
Product Design and Technology - Food	Physical Education
Product Design and Technology - Textiles	Physics
Product Design and Technology - Wood	Psychology
Drama	Religion and Society
Economics	Specialist Mathematics
Further Mathematics	Studio Arts (Folio – continuing students only)
Geography	VETiS Music Industry (continuing students only)
Health & Human Development	Visual Communication Design (Folio – continuing students only)
History Revolutions	VET <i>*Refer to VET/VCAL Handbook</i>

AUSTRALIAN CATHOLIC UNIVERSITY ADVANCED STANDING STUDIES

A student who is interested in selecting the ACU Advanced Standing Studies option must demonstrate academic success and a high level of commitment to learning. An Advanced Standing Study is a full first year university subject made up of two units, one offered in semester one and the other offered in semester two. Please note, that an Advanced Standing Study contributes an INCREMENT of the ATAR (i.e. 10%). Thomas Carr College offers Advanced Standing Studies in Education and Health. A Year 12 student wishing to undertake an Advanced Standing Study in either Education or Health will need to demonstrate competence by presenting at least two of the following pieces of evidence to the relevant ACU Advanced Standing Study teacher:

- grades for assessments and examinations
- any relevant evidence from work completed outside of school
- recommendation from a current relevant subject teacher.

Uni Step-Up

In 2017 Australian Catholic University will be offering a range of **Advance Standing Studies** to partner schools in Victoria.

The three studies are represented in the following table. You will notice that an Advanced Standing Study is a full first year university subject made up of two units, one offered in semester one and the other offered in semester two.

Subject	Semester Study	VCE Abbreviated Study name	ACU admission code name for subject	Offered by Faculty of...	Leads to....
EDFD127 Contexts for Learning and Development	1	ACU EDUCATION	EDFZ127	Education	Bachelor of Education (Early Childhood, Primary, Secondary)
EDFD133 Understanding Learning	2		EDFZ133		
HLSC111 The Person, Health and Wellbeing	1	ACU HEALTH SCIENCE	HLSZ111	Health Sciences	Bachelor of Nursing Bachelor of Midwifery Bachelor of Paramedicine Bachelor of Physiotherapy Bachelor of Occupational Therapy Bachelor of Speech Pathology
HLSC120 Society, Culture and Health Science	2		HLSZ120		

Considerations regarding the mode of delivery are as follows:

- That a teacher from one of the partner schools delivers the course under the guidance and mentoring of an academic from ACU Melbourne campus.
- That the teacher who delivers the course has methods in appropriate subject areas that align with the offered subject
- That the mentor from ACU be available throughout the time the course is delivered
- That the course is assessed by ACU under the assessment methods laid out for that particular subject
- That the students doing the course would be offered on-campus experiences through visits and practicals and these would be done at mutually agreeable times
- An ACU Academic Skills advisor be available to the cohort throughout the duration of the course

ACU is committed to exploring and developing programs and pathways for students from its partner schools in order for them to aspire to university and have flexible access to higher education.

The Uni Step-Up experience offers students:

- A vocational pathway earlier than expected
- An opportunity to keep their university aspirations open
- Experience of university life, to dispel misconceptions and enable easier transition into university later
- A subject of their degree HECS free

ACU HEALTH SCIENCE

ACU Health Science allows students to commence a Bachelor of Nursing, Bachelor of Midwifery, or a Bachelor of Paramedicine at the Australian Catholic University as part of their Year 12 VCE course.

Learning Focus

This subject consists of 2 units:

The first unit focuses on the person as the centre of the health care experience. Emotional, cognitive, motivational and behavioural factors that influence health, illness and the health care experience will be explored. There will be a major emphasis on psychological resilience and coping across the lifespan. This foundational knowledge in human behaviour and development will enable the health professional to understand how individuals respond to the challenge of health maintenance, illness and hospitalisation in the contemporary health care environment.

In the second unit students will be introduced to changes in contemporary Australian society, culture and health that have been influenced by globalisation. The consequential increasing cultural diversity in society challenges the organisation and provision of health care in Australia. Students will explore how understandings of health and illness are constructed within diverse cultures in contrast with bio-medical constructions of health and illness. Factors that shape distribution and ownership of resources and how they influence the maintenance of health by individuals and groups within society will also be explored. The social-historical-political context and related health issues of vulnerable people in marginalised social groups are a special focus of this unit, with particular attention to Australian Aboriginal and Torres Strait Islander peoples.

Outcomes/Assessment

Students studying ACU Health Science will be expected to:

Undertake assessment based on online exercises, class presentations, a case study and an examination. These tasks are designed to allow students to demonstrate significant knowledge of the material covered and the ability to apply it to real-life situations and further develop their interest.

ACU Health Science Curriculum Pathways

Students in this subject may choose to continue with the Bachelor of Nursing, Bachelor of Midwifery, or a Bachelor of Paramedicine at the Australian Catholic University. ACU Health Science units are however accredited nationally and so it can be used for a number of other degrees at most Australian Universities which offers these courses.

CURRICULUM INFORMATION

Accounting Units 3 & 4

Rationale:	VCE Accounting focuses on the financial recording, reporting and decision-making processes of a sole proprietor small business. Students study both theoretical and practical aspects of accounting. Financial data will be collected and recorded, and accounting information reported, using both manual and information and communications technology (ICT) methods.
Learning Focus:	The Units focus on financial accounting for a single activity trading business as operated by a sole trader and emphasises the role of accounting as an information system. Students use the double entry system of recording financial data and prepare reports using the accrual basis of accounting. The perpetual method of stock recording with the First In, First Out (FIFO) method is also used. Students investigate the role and importance of budgeting for the business and undertake the practical completion of budgets for cash, profit and financial position. Students interpret accounting information from accounting reports and graphical representations, and analyse the results to suggest strategies to the owner on how to improve the performance of the business. Where appropriate, the accounting procedures developed in each area of study should incorporate the application of accounting principles and the qualitative characteristics of accounting information.
Outcomes / Assessment:	Students studying Accounting Units 3 and 4 will be expected to: <ul style="list-style-type: none"> ▪ Record financial data for a single activity sole trader using a double entry system, and discuss the function of various aspects of this accounting system. ▪ Record balance day adjustments and prepare and interpret accounting reports. ▪ Prepare budgets and variance reports, evaluate the performance of a business using financial and non-financial information and discuss strategies to improve the profitability and liquidity of the business. ▪ Record financial data using double entry accounting and report accounting information using an accrual-based system for a single activity sole trader, and discuss the function of various aspects of this accounting system.
Pathways:	Pathways that may be of interest to students of Accounting Unit 3 and 4 include the pursuit of studies at tertiary level including the roles of Accountant, Banking and Finance, Economist, Marketing Manager, Operations Management, Industrial Relations Officer, Public Relations, International Trade, Hospitality and Tourism, Teacher, Administration.

ACU Education

Rationale:	ACU Education allows students to commence a University Bachelor of Education course as part of their Year 12 VCE course. It consists of two units, Contexts for Learning and Development and Understanding Learning. These units are designed to give an introduction into those things that promote or hinder student's learning at school.
Learning Focus:	Students look at the contexts for learning and development focusing on the fundamental concepts and theories within a critical reflective approach. Students deepen their understanding of children and school-aged young people as individual persons and members of social groups. All students will consider and critique a range of theories concerning the physical, cognitive and psychosocial aspects of development and will examine ideas and debates about the context of development with specific reference to family, childcare, school, peers, culture and diverse social contexts, as well as developmental differences and disabilities. Students develop the understanding of the learning theories, elements of pedagogy, teaching strategies and applications to curriculum design and teaching which are developed further in subsequent units.
Outcomes / Assessment:	Students studying ACU Education will be expected to: <ul style="list-style-type: none"> ▪ Undertake assessment based on on-line exercises, class presentations, a case study and an examination. These tasks are designed to allow students to demonstrate significant knowledge of the material covered and the ability to apply it to real -life situations and further develop their interest in.
Pathways:	Students in this subject may choose to continue with the Bachelor of Education course at the Australian Catholic University. ACU Education units are however accredited Nationally and so can be used for any number of Arts and Education degrees at any Australian University which offers those courses.

Art Units 3 & 4

Rationale:	The VCE Art study recognises art as an integral part of our lives. Art is a potent and dynamic visual language through which we are able to communicate personal experiences, ideas, cultural values and beliefs. In both the process of making and examining art, students can realise the power to inspire change through imagination, creativity and innovation.
Learning Focus:	In Unit 3 Art students study selected artists and use the Analytical Frameworks for interpreting and analysing the meaning of artworks. Applied together, these Analytical Frameworks help students to appreciate how an artwork may contain different aspects and layers of meaning. Students link their growing theoretical understanding of art to their own practice. Their art making is supported through investigation, exploration and application of a variety of materials and techniques. In Unit 4 students continue to develop personal points of view and informed opinions about art ideas or issues and support them with evidence. In relation to their developing artwork students continue to build upon ideas and concepts begun in Unit 3. They focus on the development of a body or folio of work that demonstrates creativity and imagination, the evolution of ideas and the realisation of appropriate concepts, knowledge and skills. A final set of completed art works is exhibited in the final College exhibition as a celebration of the year's work.
Outcomes / Assessment:	<p>Unit 3 Interpreting art / Investigation and interpretation through artmaking: Outcomes</p> <ul style="list-style-type: none"> ▪ Use of the Analytical Frameworks to analyse and interpret artworks: Theory ▪ Explore personal ideas and concepts through a conceptual and practical investigation, including at least one finished artwork: Folio <p>Unit 4 Discussing and debating art/Realisation and resolution: Outcomes</p> <ul style="list-style-type: none"> ▪ Discuss and debate an art issue using selected artist/s works as context, with the support of selected commentaries and relevant aspects of the ▪ Analytical Frameworks: Theory ▪ Progressively communicated ideas, directions and/ or personal concepts in a body of work, having used selected Analytical Frameworks to underpin reflections on their artmaking: Folio
Pathways:	Art provides a foundation pathway which VCE students can use as a basis for further education and training involving arts learning at TAFE or Tertiary level. The Arts domain provides opportunities for students to create and critically explore visual culture, individual arts disciplines incorporating contemporary and traditional genres, and art works that involve the fusion of traditional techniques and new forms of multi-media.

Biology Units 3 & 4

<p>Rationale:</p>	<p>VCE Biology enables students to investigate the processes involved in sustaining life at cellular, system, species and ecosystem levels. In undertaking this study, students examine how life has evolved over time and understand that in the dynamic and interconnected system of life all change has a consequence that may affect an individual, a species or the collective biodiversity of Earth. The study gives students insights into how knowledge of molecular and evolutionary concepts underpin much of contemporary biology, and the applications used by society to resolve problems and make advancements.</p>
<p>Learning Focus:</p>	<p>In unit 3 students investigate the workings of the cell from several perspectives, including; nature of the plasma membrane, the control of movement of molecules in and out of the cell, Students consider base pairing specificity, the binding of enzymes and substrates, the response of receptors to signalling molecules and reactions between antigens and antibodies to highlight the importance of molecular interactions based on the complementary nature of specific molecules. Students study the synthesis, structure and function of nucleic acids and proteins as key molecules in cellular processes. They explore the chemistry of cells by examining the nature of biochemical pathways, their components and energy transformations. Students consider the types of signals use in cell communication, the transduction of information within the cell and cellular responses. Students study the human immune system and the interactions between its components to provide immunity.</p> <p>In unit 4 students consider: the continual change and challenges to which life on Earth has been subjected. They investigate the relatedness between species and the impact of various change events on a population's gene pool. The accumulation of changes over time is considered as a mechanism for biological evolution by natural selection that leads to the rise of new species. Students examine change in life forms using evidence from palaeontology, biogeography, developmental biology and structural morphology. They explore how technological developments in the fields of comparative genomics, molecular homology and bioinformatics have resulted in evidence of change through measurements of relatedness between species. Students examine the structural and cognitive trends in the human fossil record and the interrelationships between human biological and cultural evolution. The biological consequences, and social and ethical implications, of manipulating the DNA molecule and applying biotechnologies is explored for both the individual and the species.</p>
<p>Outcomes / Assessment:</p>	<p>The student's level of achievement in Units 3 & 4 will be determined by school-assessed coursework and an end of year examination.</p> <p>School assessed coursework may include: a report of a practical activity, annotations of activities or investigations from a practical logbook, a bioinformatics exercise, an evaluation of research, media response, data analysis, a response to a set of structured questions, problem solving involving biological concepts, skills and/or issues, A structured scientific poster according to the VCAA template.</p>
<p>Pathways:</p>	<p>The study of biology prepares students for continuing studies in bioscience and entry into the workforce in a wide range of careers, including those not normally thought of as depending on bioscience. Much of our economic activity is generated through advances in bioscience research, in environmental, medical and associated biotechnologies, and in parallel sciences such as bioinformatics.</p>

Business Management Units 3 & 4	
Rationale:	VCE Business Management examines the ways in which people at various levels within a business organisation manage resources to achieve the objectives of the organisation. Students develop an understanding of the complexity, challenges and rewards that come from business management and gain an insight into the various ways resources can be managed in small, medium and large -scale organisations.
Learning Focus:	Students identify the important roles managers play in planning, organising, leading and controlling the various areas of the business, and in the operations function. Various management theories are considered and these are applied to real life business case studies. Students investigate how organisations are structured, the development of positive corporate culture, the application of management styles to various contexts, and skills necessary to be an effective manager in the 21st century. Effective strategies are investigated to effectively manage an organisations most important resources; its employees. Two key aspects of this function are investigated; the employment cycle and employee relations. Significant change issues that students study include; corporate social responsibility, globalisation, technological development, privatisation, mergers and acquisitions.
Outcomes / Assessment:	Students studying Business Management Units 3 and 4 will be expected to: <ul style="list-style-type: none"> ▪ Describe and analyse: the context in which large-scale organisations operate; major aspects of the internal environment of large-scale organisations. ▪ Identify and evaluate: practices and processes related to operations management, practices and processes related to human resource management. ▪ Analyse and evaluate the management of change in large-scale organisations
Pathways:	Pathways that may be of interest to students of Business Management Unit 3 and 4 include the pursuit of studies at tertiary level including the roles of Marketing Manager, Operations Management, Industrial Relations Officer, Human Resource Management, Public Relations, International Trade, Banking and Finance, Hospitality and Tourism, Teacher, Administration.

Chemistry Units 3 & 4	
Rationale:	The study of Chemistry looks at the ever increasing global demand for the supply of energy and materials used to generate this energy. Students explore energy options and the chemical production of materials with reference to efficiencies, renewability and the minimisation of their impact on the environment. Students evaluate different chemical resources, including fossil fuels, biofuels, galvanic cells and fuel cells and look at chemical processes designed to optimise efficiency. Students also investigate unique characteristics of carbon that explain the diversity and number of organic compounds that not only constitute living tissue but are also found in fuels, foods, medicines and many of the materials we use in everyday life.
Learning Focus:	Unit 3: Energy Production; Chemical Yield optimisation Students compare fuels quantitatively with reference to combustion products and energy outputs, apply knowledge of the electrochemical series to design, construct and test galvanic cells and evaluate energy resources based on efficiency, renewability and environmental impact. Students will apply rate and equilibrium principles to predict how the rate and extent of reactions can be optimised and explain how electrolysis is involved in the production of chemicals and in the recharging of batteries. Unit 4: Organic reaction pathways and instrumentation; Chemistry of Food Students compare the general structures and reactions of the major organic families of compounds, deduce structures of organic compounds using instrumental analysis data, and design reaction pathways for the synthesis of organic molecules. Students will also distinguish between the chemical structures of the key food molecules, analyse the chemical reaction involved in the metabolism of the major components of food including the role of enzymes and calculate the energy content of food using calorimetry.
Outcomes / Assessment:	Satisfactory completion of Unit 3 and 4 Chemistry is demonstrated based on the completion of school assessed coursework which address the four areas of study. This is achieved through the successful completion of Laboratory Reports/ Investigation- Energy Efficiency; Response to Stimulus material -Topic Tests; Instrumental Analysis - At least two practical activities. A comparison of food molecules – investigation, laboratory report or investigation. A structured scientific poster according to VCAA standard template – related to energy and/or food
Pathways:	Students can continue to study Chemistry in a variety of University degrees including Science and Engineering, engineering, biological science, Medicine, Health Science, Applied Science, environmental science and allied fields.

Drama Units 3 & 4

Rationale:	People tell stories, explore ideas, make sense of their worlds and communicate meaning through drama. Drama develops personal and social identity. VCE Drama connects students to the traditions of drama practice and, through the processes of devising and performing drama, allows them to explore, understand and respond to the contexts, narratives and stories that shape their worlds. The study requires students to be creative and critical thinkers. Through work as solo and ensemble performers and engagement with the work of professional drama practitioners, students develop an appreciation of drama as an art form and develop skills of criticism and aesthetic understanding. VCE Drama equips students with knowledge, skills and confidence to communicate as individuals and collaboratively in social and work -related contexts. The study of drama can provide pathways to training and tertiary study in acting, communication and drama criticism.
Learning Focus:	These units focus on the creation of non-naturalistic solo and ensemble performances from a variety of stimuli. Non-naturalistic performance styles and associated theatrical conventions are explored in the creation, development and presentation of a solo and ensemble performances. Students use and manipulate dramatic elements, expressive skills and performance styles to enhance performance. They select stagecraft and theatrical conventions as appropriate to the performance. Students also document and evaluate stages involved in the creation, development and presentation of their performances. A professional performance that incorporates non-naturalistic performance style/s and production elements selected from the prescribed VCE Unit 3 Drama Playlist published annually in the VCAA Bulletin will also be analysed.
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ Ensemble performance ▪ Short solo and written report ▪ Written evaluations ▪ Written examination ▪ Solo performance examination
Pathways:	The study of drama provides students with pathways to further studies in fields such as acting, direction, playwriting, production design, production management and studies in drama criticism. Students of drama gain considerable experience in performance which can be applied to several professional skills including public speaking, presentation, collaboration and interpersonal communication.

Economics Units 3 & 4

Rationale:	Economics is the study of how individuals and societies use resources to satisfy needs. It is central to understanding why individuals and societies behave as they do. Economic decisions are about resource use in producing goods and services and about the distribution of the proceeds of production. To understand the basis for these decisions, and their impact, requires an understanding of basic economic principles and concepts.
Learning Focus:	Students will develop an awareness of the links between economics and the influence of political, ethical, environmental and social forces on economic decision making. Students develop an ability to identify, collect and process data from a range of sources. They use the inquiry process to plan economics investigations, analyse data and form conclusions supported by evidence. They also use economic reasoning, including cost- benefit analysis, to solve economic problems, which assist them in understanding the economy, society and environment, and to verify values and attitudes about issues affecting the economy, society and environment.
Outcomes / Assessment:	Students studying Economics Units 3 and 4 will be expected to: <ul style="list-style-type: none"> ▪ Examine the factors that affect the price and quantity traded in individual markets. Students investigate the importance of competition and analyse the degree of market power in different industries and how this affects the efficiency of resource allocation. ▪ Explain how changes in interest rates will affect inflation, the rate of unemployment and the rate of economic growth. ▪ Describe how the federal government alters the composition and magnitudes of its receipts and expenditure to influence directly and indirectly the components of aggregate demand.
Pathways:	Economist, Marketing Manager, Operations Management, Industrial Relations Officer, Public Relations, International Trade, Teacher, Administration.

English Units 3 & 4

Rationale:	The study of English contributes to the development of literate individuals capable of critical and creative thinking, aesthetic appreciation and creativity. This study also develops students' ability to create and analyse texts, moving from interpretation to reflection and critical analysis. Through engagement with texts from the contemporary world and from the past, and using texts from Australia and from other cultures, students studying English become confident, articulate and critically aware communicators and further develop a sense of themselves, their world and their place within it. English helps equip students for participation in a democratic society and the global community. This study will build on the learning established through AusVELS English in the key discipline concepts of language, literature and literacy, and the language modes of listening, speaking, reading, viewing and writing.
Learning Focus:	In Unit 3 students read and respond to texts analytically and creatively. They analyse arguments and the use of persuasive language in texts. In Unit 4 students compare the presentation of ideas, issues and themes in texts. They create an oral presentation intended to position audiences about an issue currently debated in the media.
Outcomes / Assessment:	Students studying Units 3 and 4 English will be need to satisfactorily complete: <ul style="list-style-type: none"> ▪ A text response essay ▪ A creative response ▪ An oral speech conveying an opinion ▪ A language analysis essay ▪ A comparative response ▪ End of year examination
Pathways:	Students must undertake Unit 3 prior to undertaking Unit 4. Units 1 to 4 are designed to a standard equivalent to the final two years of secondary education. All VCE studies are benchmarked against comparable national and international curriculum.

Further Mathematics Units 3 & 4

Rationale:	Mathematics is the study of function and pattern in number, logic, space and structure. It provides both a framework for thinking and a means of symbolic communication that is powerful, logical, concise and precise. It also provides a means by which people can understand and manage their environment. Essential mathematical activities include calculating and computing, abstracting, conjecturing, proving, applying, investigating, modelling, and problem posing and solving. Further Mathematics consists of compulsory of Areas of Study in Unit 3 'Data Analysis' and Recursion' and 'Financial Modelling'. Unit 4 comprises two selected modules out of four: Matrices and Networks. Assumed knowledge and skills for 'Data Analysis'; area of study is contained in the topics. Univariate Data, Bivariate Data, Linear Graphs and Modelling Linear Relations and Equations from General Mathematics Units 1 & 2.
Learning Focus:	The appropriate use of technology to support and develop the teaching and learning of mathematics is to be incorporated throughout the units. This will include the use of some of the following technologies for various areas of study or topics: graphics calculators, spread sheets, graphing packages, statistical analysis systems, dynamic geometry systems, and computer algebra systems. In particular, students are encouraged to use graphics or CAS calculators, computer algebra systems, spread sheets or statistical software in 'Data analysis', dynamic geometry systems in 'Geometry and trigonometry' and graphics calculators, graphing packages or computer algebra systems in the remaining areas of study, both in the learning of new material and the application of this material in a variety of different contexts.
Outcomes / Assessment:	Unit 3: <ul style="list-style-type: none"> ▪ Area of Study 1: Core – Data Analysis ▪ Area of Study 2: Recursion and Financial Modelling Unit 4: <ul style="list-style-type: none"> ▪ Area of Study 1: Matrices ▪ Area of Study 2: Networks
Pathways:	Students can undertake appropriate tertiary studies after completing Further Maths at VCE level.

Geography Units 3 & 4

Rationale:	VCE Geography enables students to examine natural and human phenomena, how and why they change, their interconnections and the patterns they form across the Earth's surface. In doing so, they develop a better understanding of their own place and its spaces and those in other parts of the world. These spatial perspectives, when integrated with historical, economic, ecological and cultural perspectives, deepen understanding of places, environments and human interactions with these. Interpretative and analytical skills enable students to interpret information presented in a variety of formats including maps, graphs, diagrams and images.
Learning Focus:	<p><u>Unit 3: Changing the land</u> This unit focuses on two investigations of geographical change: change to land cover and change to land use. Students investigate three major processes that are changing land cover in many regions of the world. Students investigate the distribution and causes of these three processes. At a local scale students investigate land use change using appropriate fieldwork techniques and secondary sources. They investigate the scale of change, the reasons for change and the impacts of change. Students undertake fieldwork and produce a fieldwork report using the structure provided.</p> <p><u>Unit 4: Human population – trends and issues</u> In this unit students investigate the geography of human populations. They explore the patterns of population change, movement and distribution, and how governments, organisations and individuals have responded to those changes in different parts of the world. Population movements such as voluntary and forced movements over long or short terms add further complexity to population structures and to economic, social, political and environmental conditions.</p>
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ School-assessed Coursework Unit 3: 25 per cent (Field Report, Structured Questions and Data Analysis) ▪ School-assessed Coursework Unit 4: 25 per cent (Structured Questions and Data Analysis) ▪ End-of-year examination: 50 per cent
Pathways:	Geographer, Urban Planning, Climatologist, Environmental Sciences, Geology, Anthropology, Education, Marketing, Surveying, Policy Making, Cartographer, International Aid Organisations.

Health & Human Development Units 3 & 4

Rationale:	Through the study of VCE Health and Human Development, students investigate health and human development in local, Australian and global communities. The study of Health and Human Development is based on the premise that health and human development needs to be promoted at an individual level, and within group and community settings at national and international levels, to maximize global development potential. This underpins the structure of the four units of Health and Human Development. The study also promotes the understanding that nutrition plays a major role in influencing both health status and individual human development.
Learning Focus:	Health and Human Development provides students with an understanding of the health status of Australians by investigating the burden of disease and the health of population groups in Australia. Students use key health measures to compare health in Australia with other developed countries, and analyse how biological, behavioural and social determinants of health contribute to variations in health status. Students examine the development of the NHPAs and their relationship to burden of disease in Australia. Students examine different models of health and health promotion. They investigate the roles and responsibilities of governments in addressing health needs and promoting health. In Unit 4 students explore global health, human development and sustainability and their interdependencies. They identify similarities and differences in the health status between people living in developing countries and Australians, and analyse reasons for the differences. The role of the United Nations Millennium Development Goals is investigated in relation to achieving sustainable improvements in health status and human development. Students explore the role of international organisations including the UN and WHO in achieving sustainable improvements in health and human development. Students consider strategies designed to promote health and sustainable human development globally as well as Australia's contribution to international health programs through AusAid and contributions to non-government.
Outcomes / Assessment:	Students studying Unit 3 and 4 Health and Human Development will be expected to complete the following Assessments (SAC): <ul style="list-style-type: none"> ▪ Data Analyses ▪ Written response ▪ Tests ▪ Examinations
Pathways:	Students can elect to study many courses at university and TAFE in Health Sciences.

History Revolutions (French & Russian) Units 3 & 4	
Rationale:	Revolutions are the great disjuncture of modern times and mark deliberate attempts at new directions. They share the common aim of breaking with the past by destroying the regimes and societies that engender them and embarking on a program of political and social transformation. In Unit 3&4 our students are introduced to the events, people, movements and ideas that drive political, economic and social change in our modern world, within the context of the French and Russian Revolutions.
Learning Focus:	Students investigate the causes for the French and Russian Revolutions, with a focus on the revolutionary ideas, leaders, movements and events that occurred. They investigate the weakness in the existing regimes and the extent to which these regimes were unable to respond to the changing political, economic and/or social scene. Students examine the development of the new political order and the emerging society, and the challenges faced by the revolutionary governments, for example: political dissent, civil war, economic breakdown, wars of foreign intervention and resistance to revolutionary forces. Students delve into the debates that exist between historians, analysing historical commentaries, evaluating differing viewpoints and establishing through critical analysis, judgements regarding how successful revolutions and revolutionaries have been in bringing about change.
Outcomes / Assessment:	Students studying Units 3 and 4 History Revolutions will be expected to: <ul style="list-style-type: none"> ▪ Describe and analyse events, people, ideas and movements that caused the French and Russian Revolutions; ▪ Identify and evaluate the challenges faced by emerging regimes and the ways in which attempts were made to create new societies, and the nature of these new societies; ▪ Gather, analyse and evaluate evidence, and synthesise ideas in order to develop coherent arguments on the material covered.
Pathways:	Pathways that may be of interest to students of History Revolutions Unit 3 and 4 include the pursuit of studies at tertiary level including the roles of teaching, work in archives, libraries, and museums; professional consultants in public history; journalism, publishing, public relations, advertising, civil service, planning and policy administration; finance and service industry.

Legal Studies Units 3 & 4	
Rationale:	VCE Legal Studies examines the processes of law-making, dispute resolution and the administration of justice in Australia. Students develop an understanding of the impact of the legal system on the lives of citizens, and the implications of legal decisions and outcomes on Australian society. The study provides students with an appreciation of how individuals can be involved in decision-making within the legal system, encouraging civic engagement and helping them to become more informed and active citizens.
Learning Focus:	Students develop an appreciation of the complex nature of law-making by investigating the key features and operation of parliament, and influences on law-making. Students develop an understanding of the importance of the Constitution in their lives and on society as a whole, and undertake a comparative analysis with another country. They learn of the importance of the role played by the High Court of Australia in interpreting and enforcing the Constitution, and ensuring that parliaments do not act outside their areas of power nor infringe protected rights. Students examine the institutions that adjudicate criminal cases and civil disputes. Students investigate the processes and procedures followed in courtrooms and develop an understanding of the adversary system of trial and the jury system, as well as pre-trial and post-trial procedures that operate in the Victorian legal system. Using the elements of an effective legal system, students consider the extent to which court processes and procedures contribute to the effective operation of the legal system. They also consider reforms that could further improve its effective operation.
Outcomes / Assessment:	Students studying Legal Studies Units 3 and 4 will be expected to: <ul style="list-style-type: none"> ▪ Describe the role and effectiveness of Parliament as a law-making body as well as evaluate the need for change in the law. ▪ Students need to analyse ways changes in the law might be influenced, explain the role of the Commonwealth Constitution in defining the law-making powers of the state and Commonwealth parliaments and evaluate the effectiveness of the Constitution in protecting human and democratic rights. ▪ Students describe the role of the courts and their relationship with Parliament. ▪ Explain the elements of an effective legal system and evaluate the processes and procedures for the resolution of criminal and civil disputes.
Pathways:	Pathways that may be of interest to students of Legal Studies Unit 3 and 4 include the pursuit of studies at tertiary level including the roles of Solicitor, Barrister, Paralegal, Police officer, Prison staff.

Literature Units 3 & 4

<p>Rationale:</p>	<p>VCE Literature provides opportunities for students to develop their awareness of other people, places and cultures and explore the way texts represent the complexity of human experience. Students examine the evolving and dialogic nature of texts, the changing contexts in which they were produced and notions of value. They develop an understanding and appreciation of literature, and an ability to reflect critically on the aesthetic and intellectual aspects of texts. The study of Literature enables students to consider the power and complexity of language, the ways literary features and techniques contribute to meaning and the significance of form and structure. They develop their capacity to read and interpret texts and reflect on their interpretations and those of others, and in turn reflect on their personal experience and the experiences of others, cultivating an awareness that there are multiple readings of texts and that the nature of language and text is dynamic. They are encouraged to be independent, innovative and creative, developing the ability to read deeply and widely and to establish and articulate their views through creative and analytical responses.</p>
<p>Learning Focus:</p>	<p>In Unit 3 students consider how the form of a text affects meaning, and how writers construct their texts. They investigate ways writers adapt and transform texts and how meaning is affected as texts are adapted and transformed. They consider how the perspectives of those adapting texts may inform or influence the adaptations. Students draw on their study of adaptations and transformations to develop creative responses to texts.</p> <p>In Unit 4 students develop critical and analytic responses to texts. They consider the context of their responses to texts as well as the ideas explored in the texts, the style of the language and points of view. They investigate literary criticism informing both the reading and writing of texts. Students develop an informed and sustained interpretation supported by close textual analysis. For the purposes of this unit, literary criticism is characterised by extended, informed and substantiated views on texts and may include reviews, peer-reviewed articles and transcripts of speeches. Specifically, for Unit 4 Outcome 1, the literary criticism selected must reflect different perspectives, assumptions and ideas about the views and values of the text/s studied.</p>
<p>Outcomes / Assessment:</p>	<p>Students studying Units 3 and 4 Literature will need to satisfactorily complete:</p> <ul style="list-style-type: none"> ▪ Analyse the extent to which meaning changes when a text is adapted to a different form ▪ Short Story ▪ Respond creatively to a text and comment on the connections between the text and the response ▪ Produce an interpretation of a text using different literary perspectives to inform their view ▪ Analyse features of a text and develop and justify interpretations of texts
<p>Pathways:</p>	<p>Students who satisfactorily complete Units 3 and 4 of Literature have the option of completing further literary studies at university and beyond. As active, critically aware citizens, students can go on to interpret and make effective use of the specialist language of diverse texts, including texts relevant to academic disciplines and to workplace situations.</p>

Language: Indonesian Second Language Units 3 & 4

Rationale:	The study of Languages contributes to the overall education of students, most particularly in the area of communication, but also in the areas of cross-cultural understanding, cognitive development, literacy and general knowledge. It provides access to the culture of communities which use the language and promotes understanding of different attitudes and values within the wider Australian community and beyond.
Learning Focus:	The detailed study should enable the student to explore and compare aspects of the language and culture of the Indonesian-speaking community through a range of oral and written texts in Indonesian related to the selected sub-topic. This will enable the student to develop knowledge and understanding of, for example, historical issues, aspects of contemporary society or the literary or artistic heritage of the community. The texts which form the basis of this study might include feature films, short films, short stories, songs, newspaper articles, electronic texts, documentaries, music, painting and oral histories. The length of texts selected will vary depending on the type of text, its density and level of complexity. In order for the student to be able to explore their sub-topic in sufficient depth to meet the relevant outcomes, it is suggested that a range of at least three different kinds of text are selected. These might include aural and visual, as well as written texts.
Outcomes / Assessment:	<p>Unit 3</p> <p>Outcome 1: On completion of this unit the student should be able to express ideas through the production of original texts.</p> <p>Outcome 2: On completion of this unit the student should be able to analyse and use information from spoken texts.</p> <p>Outcome 3: On completion of this unit the student should be able to exchange information, opinions and experiences.</p> <p>Unit 4</p> <p>Outcome 1: On completion of this unit the student should be able to analyse and use information from written texts.</p> <p>Outcome 2: On completion of this unit the student should be able to respond critically to spoken and written texts which reflect aspects of the language and culture of Indonesian-speaking communities.</p>
Pathways:	Students must undertake Unit 3 prior to undertaking Unit 4. Languages studies in Indonesian at VCE attract bonus points for candidates facilitating higher education entry. The ENTER score is used to determine tertiary access, acknowledges language study. Second language study can be a good predictor of a student's ability to pursue a demanding post-compulsory program of study. This is because a second language requires sustained effort over time and as a cumulative subject of study, it is both practical and academic at the same time.

Language: Japanese Units 3 & 4

Rationale:	The study Languages contributes to the overall education of students, most particularly in the area of communication, but also in the areas of cross-cultural understanding, cognitive development, literacy and general knowledge. It provides access to the culture of communities which use the language and promotes understanding of different attitudes and values within the wider Australian community and beyond.
Learning Focus:	The areas of study for Japanese Second Language comprise themes and topics, text types, kinds of writing, vocabulary and grammar. They are common to all four units of the study, and are designed to be drawn upon in an integrated way, as appropriate to the linguistic needs of the student, and the outcomes for the unit. The themes and topics are the vehicle through which the student will demonstrate achievement of the outcomes, in the sense that they form the subject of the activities and tasks the student undertakes. The text types, kinds of writing, vocabulary and grammar are linked, both to each other, and to the themes and topics. Together, as common areas of study, they add a further layer of definition to the knowledge and skills required for successful achievement of the outcomes. The common areas of study provide the opportunity for the student to build upon what is familiar, as well as develop knowledge and skills in new and more challenging areas.
Outcomes / Assessment:	<p>Unit 3</p> <p>Outcome 1: On completion of this unit the student should be able to express ideas through the production of original texts.</p> <p>Outcome 2: On completion of this unit the student should be able to analyse and use information from spoken texts.</p> <p>Outcome 3: On completion of this unit the student should be able to exchange information, opinions and experiences.</p> <p>Unit 4</p> <p>Outcome 1: On completion of this unit the student should be able to analyse and use information from written texts.</p> <p>Outcome 2: On completion of this unit the student should be able to respond critically to spoken and written texts which reflect aspects of the language and culture of Japanese-speaking communities.</p>
Pathways:	Students must undertake Unit 3 prior to undertaking Unit 4. Languages studies in Japanese at VCE attract bonus points for candidates facilitating higher education entry. The ATAR score is used to determine tertiary access acknowledges language study. Second language study can be a good predictor of a student's ability to pursue a demanding post-compulsory program of study. This is because a second language requires sustained effort over time and as a cumulative subject of study, it is both practical and academic at the same time.

Language: Italian Units 3 & 4

Rationale:	The study of Languages contributes to the overall education of students, most particularly in the area of communication, but also in the areas of cross-cultural understanding, cognitive development, literacy and general knowledge. It provides access to the culture of communities which use the language and promotes understanding of different attitudes and values within the wider Australian community and beyond.
Learning Focus:	The areas of study for Italian comprise themes and topics, text types, kinds of writing, vocabulary and grammar. They are common to all four units of the study, and they are designed to be drawn upon in an integrated way, as appropriate to the linguistic needs of the student, and the outcomes for the unit. The themes and topics are the vehicle through which the student will demonstrate achievement of the outcomes, in the sense that they form the subject of the activities and tasks the student undertakes. The text types, kinds of writing, vocabulary and grammar are linked, both to each other, and to the themes and topics. Together, as common areas of study, they add a further layer of definition to the knowledge and skills required for successful achievement of the outcomes. The common areas of study have been selected to provide the opportunity for the student to build upon what is familiar, as well as develop knowledge and skills in new and more challenging areas.
Outcomes / Assessment:	<p>Unit 3</p> <p>Outcome 1: On completion of this unit the student should be able to express ideas through the production of original texts.</p> <p>Outcome 2: On completion of this unit the student should be able to analyse and use information from spoken texts.</p> <p>Outcome 3: On completion of this unit the student should be able to exchange information, opinions and experiences.</p> <p>Unit 4</p> <p>Outcome 1: On completion of this unit the student should be able to analyse and use information from written texts.</p> <p>Outcome 2: On completion of this unit the student should be able to respond critically to spoken and written texts which reflect aspects of the language and culture of Italian-speaking communities.</p>
Pathways:	Students must undertake Unit 3 prior to undertaking Unit 4. Italian is designed for students who will, typically, have studied the language for at least 200 hours prior to the commencement of Unit 1. It is possible, however, that some students with less formal experience will also be able to meet the requirements successfully. Units 1 to 4 are designed to be of an appropriate standard for the final years of secondary education. All VCE studies are benchmarked against comparable national and international curriculum.

Informatics Units 3 & 4

<p>Rationale:</p>	<p>This study equips students with the knowledge and skills to be discerning users of digital systems, data and information and creators of digital solutions. They are equipped to apply new ways of thinking as well as technical and social protocols when developing intellectual and social capital. VCE Computing supports students to participate in a globalised society and economy as they learn how to exploit the capabilities of digital systems and manage risks when communicating and collaborating with others locally and globally. The study provides students with practical opportunities to create digital solutions for real-world problems in a range of settings, developing an essential tool set for current and future learning, work and social endeavours.</p>
<p>Learning Focus:</p>	<p>In Unit 3 students consider data and how it is acquired, managed, manipulated and interpreted to meet a range of needs.</p> <p>In Area of Study 1 students investigate the way organisations acquire data using interactive online solutions. They examine how relational database management systems (RDBMS) store and manipulate data. Students use software to create user flow and acquire and apply knowledge and skills in the use of an RDBMS to create a solution.</p> <p>In Area of Study 2 students complete the first part of a project. They frame a hypothesis and then select, acquire and organise data from multiple data sets to confirm or refute this hypothesis. This data is manipulated using tools such as spreadsheets or databases to help analyse and interpret it so that students can form a conclusion regarding their hypothesis.</p> <p>The second part of the project is completed in Unit 4.</p> <p>In Unit 4 Area of Study 1 students draw on the analysis and conclusion of their hypothesis determined in Unit 3, Outcome 2, and then design, develop and evaluate a multimodal, online solution that effectively communicates the conclusion and findings.</p> <p>In Area of Study 2, students explore how different organisations manage the storage and disposal of data and information to minimise threats to the integrity and security of data and information and to optimise the handling of information.</p>
<p>Outcomes / Assessment:</p>	<ul style="list-style-type: none"> ▪ VCAA Examination at the end of semester 2. ▪ Design and develop a solution using a relational database management system, and diagrammatically represent how users interact with an online solution when supplying data for a transaction. ▪ Use a range of appropriate techniques and processes to acquire, prepare, manipulate and interpret complex data. ▪ Design, develop and evaluate a multimodal online solution that confirms or refutes a hypothesis. ▪ Compare and contrast the effectiveness of information management strategies used by two organisations to manage the storage and disposal of data and information and recommend improvements to their current practices.
<p>Pathways:</p>	<p>Students Studying Informatics make available pathways via appropriate university selection into Information Technology Security, Networking, System maintenance, Project Management and Computational thinking.</p>

Mathematical Methods (CAS) Units 3 & 4	
Rationale:	The study of Mathematical Methods (CAS) Units 3 & 4, taken alone or in conjunction with either Specialist Mathematics Units 3 & 4 or Further Mathematics Units 3 & 4, provide an appropriate background for further study in Science, Humanities, Economics or Medicine.
Learning Focus:	Students are expected to be able to apply techniques, routines and processes involving rational and real arithmetic, algebraic manipulation, equation solving, graph sketching, differentiation and integration with and without the use of technology, as applicable. Students should be familiar with relevant mental and by hand approaches in simple cases. The appropriate use of computer algebra system technology (CAS) to support and develop the teaching and learning of mathematics, and in related assessments, is to be incorporated throughout the course. This will include the use of computer algebra technology to assist in the development of mathematical ideas and concepts, the application of specific techniques and processes to produce required results and its use as a tool for systematic analysis in investigative, problem-solving and modelling work. Other technologies such as spreadsheets, dynamic geometry systems or statistical analysis systems may also be used as appropriate for various topics from within the areas of study.
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ Students studying Units 3 and 4 Mathematical Methods CAS will be expected to do: ▪ SAC 1 (Test) – Functions and relations, Families of functions, Polynomial functions. Outcome 1 & 3. ▪ SAC 2 (Test) – Exponential and logarithmic functions, Differentiation of polynomials, power functions and rational functions. Outcome 1 & 3. SAC 3 (Application task) – Optimisation (finding maximum volume) using differentiation. Outcome 1-3. ▪ SAC 4 (Analysis task) – Differential and integral calculus. Outcome 1 - 3. SAC 5 (Analysis task) – Probability. Outcome 1- 3.
Pathways:	Students can undertake further study in science, humanities, economics or medicine at university level.

Music Solo Performance Units 3 & 4	
Rationale:	Music is an integral part of all cultures and societies, both contemporary and historical. VCE Music offers students opportunities to engage in the practice of performing, creating and studying music that is representative of diverse genres, styles and cultures. Students can specialise in one or more approaches to the study of music, depending on their VCE program overall and the post-VCE pathways they may be interested in following. Students develop knowledge of stylistic, aesthetic and expressive qualities and characteristics of music and develop their ability to communicate their understanding through music making: performing, composing, arranging and/or improvising; and musicianship: aural perception, analysis and music language.
Learning Focus:	These units prepare students to present convincing performances of group and solo works. In these units, students select a program of group and solo works representing a range of styles and diversity of character for performance. They develop instrumental techniques that enable them to interpret the works and expressively shape their performances. They also develop an understanding of performance conventions they can use to enhance their performances. Students develop skills in unprepared performance, aural perception and comprehension, transcription, music theory and analysis.
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ Units 3 and 4 School-assessed Coursework: 30 per cent ▪ External end-of-year performance examination: 50 per cent ▪ External end-of-year aural and written examination: 20 per cent
Pathways:	Music Performance 3 and 4 is often the gateway to study Music at a Tertiary Institution. Alternatively, or in conjunction, students have the opportunity to study VETiS Music Industry.

Physical Education Units 3 & 4	
Rationale:	VCE Physical Education examines the biological, physiological, social and cultural influences on performance and participation in physical activity. It focuses on the interrelationship between motor learning and psychological, biomechanical, physiological and sociological factors that influence physical performances, and participation in physical activity. The study of physical activity and sedentary behaviour is significant for the understanding of health, wellbeing and performance of people. This study enables the integration of theoretical knowledge with practical application through participation in physical activities. There are opportunities for students to apply theoretical concepts and reflect critically on factors that affect all levels of performance and participation.
Learning Focus:	<p>Unit 3 introduces students to an understanding of physical activity and sedentary behaviour from a participatory and physiological perspective. Students learn the National Physical Activity Guidelines. Students study and apply the social-ecological model to identify a range of Australian strategies. Students investigate the contribution of energy systems to performance in physical activity. In particular, they investigate the characteristics of each system and the interplay of the systems during physical activity. Students explore the multi-factorial causes of fatigue and consider different strategies used to delay and manage fatigue and to promote recovery.</p> <p>In Unit 4, students learn that improvements in performance, in particular fitness, depend on the ability of the individual or coach to gain, apply and evaluate knowledge and understanding of training. Students undertake an activity analysis. Using the results of the analysis, they then investigate the required fitness components and participate in a training program designed to improve or maintain selected components. Athletes and coaches aim to continually improve and use nutritional, physiological and psychological strategies to gain advantage over the competition. Students learn to critically evaluate different techniques and practices that can be used to enhance performance, and look at the rationale for the banning or inclusion of various practices from sporting competition.</p>
Outcomes / Assessment:	Students studying Units 3 and 4 Physical Education will be expected to: complete six (6) SACS over the year, three (3) for Unit 3 and three (3) for Unit 4. These SACS will vary between case studies, tests, and laboratory sessions.
Pathways:	Students may choose to pursue further education in Physical Education studies, Nursing, Paramedics and many other available options. Students may also choose to do this through TAFE and/or university.

Physics Units 3 & 4	
Rationale:	Physics uses both scientific and mathematical knowledge to further investigate the physical environment that will allow students to develop a further curiosity at a later stage in life. Through student interest and use of technology, physics allows the next generation to think beyond the classroom to permit a desire to make sense of our world and future endeavours of human interest through science.
Learning Focus:	<p>Unit 3: In this unit students explore the importance of energy in explaining and describing the physical world. They examine the production of electricity and its delivery to homes. Students consider the field model as a construct that has enabled an understanding of why objects move when they are not apparently in contact with other objects. Applications of concepts related to fields include the transmission of electricity over large distances and the design and operation of particle accelerators. They explore the interactions, effects and applications of gravitational, electric and magnetic fields.</p> <p>Unit 4: In this unit, students explore the use of wave and particle theories to model the properties of light and matter. They examine how the concept of the wave is used to explain the nature of light and explore its limitations in describing light behaviour. Students further investigate light by using a particle model to explain its behaviour. A student-designed practical investigation related to waves, fields or motion is undertaken.</p>
Outcomes / Assessment:	<p>Unit 3 consists of the following prescribed areas of study:</p> <ul style="list-style-type: none"> ▪ How do things move without contact? ▪ How are fields used to move electrical energy? ▪ How fast can things go? <p>Unit 4 consists of the following prescribed areas of study:</p> <ul style="list-style-type: none"> ▪ How can waves explain the behaviour of light? ▪ How are light and matter similar? ▪ Practical Investigation
Pathways:	Students can continue to study Physics by electing to undertake further studies at the tertiary level. For further and up to date advice, visit the careers counsellor to determine what level of understanding of Physics may lead to a career path of interest.

Production Design & Technology: Food Units 3 & 4	
Rationale:	VCE Food and Technology focuses on the importance of food in our daily lives from both a theoretical and practical point of view. The study enables students to apply their theoretical understanding of the relationship between food and technology as they develop skills in food preparation. VCE Food and Technology challenges students to make links between food, food processing, nutrition, health and wellbeing. Students are given the opportunity to consider the importance of environmental issues and sustainability practices in food production, as well as the important role of technology in food product development. Students develop knowledge of the physical, chemical, sensory and functional properties of food and are able to apply this knowledge when using food in a practical situation. They develop and apply the knowledge and skills to prepare food safely and hygienically. Students use the design process, critical thinking and problem-solving skills to develop food products to suit specific situations or to meet the needs of individual consumers and their lifestyles.
Learning Focus:	<p>Unit 3 Food preparation, processing and food controls. In this unit students develop an understanding of food safety in Australia. They investigate the causes of food spoilage and food poisoning and apply safe work practices while preparing food. Students demonstrate understanding of key foods, analyse the functions of the natural components of key foods and apply this information in the preparation of foods. They investigate cooking techniques and justify the use of the techniques they select when preparing key foods. They also preserve food using these techniques. Students devise a design brief from which they develop a detailed design plan.</p> <p>Unit 4 Food focuses on product development and emerging trends. Students develop individual production plans for the proposed four to six food items and implement the design plan they established in Unit 3. In completing this task, students apply safe and hygienic work practices using a range of preparation and production processes, including some which are complex.</p>
Outcomes / Assessment:	<p>Students studying Year 12 Food Technology will be expected to complete the following assessment tasks:</p> <ul style="list-style-type: none"> ▪ Design brief ▪ Design plan for development of food product ▪ Written analytical tasks ▪ Evaluation tasks
Pathways:	Students who complete Year 10 Food Technology can study Food and Technology at VCE Level.

Product Design & Technology: Textiles Units 3 & 4	
Rationale:	Designers play an important part in our daily lives. They determine the form and function of the products we use. They transform ideas into drawings and plans for the creation and manufacture of useful products that fulfil human needs and wants. In recent history the use of resources to create an ever-increasing array of products has given designers an increased responsibility to think sustainably.
Learning Focus:	<p>In VCE Product Design and Technology students assume the role of a designer-maker. In adopting this role, they acquire and apply knowledge of factors that influence design. Students address the design factors relevant to their design situation. The knowledge and use of resources is integral to product design. These resources include a range of materials, and the tools, equipment and machines needed to transform these materials in a safe manner into useful products. Increasingly, the importance of environmental sustainability is having an impact on product design and development. More sustainable approaches are therefore at the forefront throughout the product lifecycle.</p> <p>Please note there is a materials cost for this subject.</p>
Outcomes / Assessment:	The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4. In the study of Product Design and Technology students' level of achievement will be determined by School-assessed Coursework, School-assessed Task and an End-of-year examination. Students present a folio that documents the Product design process used while working as a designer to meet the needs of a client and/or an end-user, and commence production of the designed product. They safely apply a range of production skills and processes to make the product designed in Unit 3, and manage time and resources effectively and efficiently. On completion of their project students evaluate the outcomes of the design, planning and production activities, explain the product's design features to the client and/or an end-user and outline its care requirements.
Pathways:	VCE Product Design and Technology can provide a pathway to a range of related fields such as industrial, product, interior and exhibition design, engineering, and fashion, furniture, jewellery, textile and ceramic design at both professional and vocational levels. Moreover, VCE Product Design and Technology can inform sustainable behaviours and develop technical skills to present multiple solutions to everyday life situations. It contributes to creating confident and unique problem solvers and project managers well equipped to deal with the multi-disciplinary nature of modern workplaces.

Product Design & Technology: Wood Units 3 & 4	
Rationale:	Designers play an important part in our daily lives. They determine the form and function of the products we use. They transform ideas into drawings and plans for the creation and manufacture of useful products that fulfil human needs and wants. In recent history the use of resources to create an ever-increasing array of products has given designers an increased responsibility to think sustainably. Students develop an understanding of the consequences of product design choices. They develop the necessary skills to critically analyse existing products and to develop their own creative solutions.
Learning Focus:	In VCE Product Design and Technology students assume the role of a designer-maker. In adopting this role, they acquire and apply knowledge of factors that influence design. Students address the design factors relevant to their design situation. The knowledge and use of resources is integral to product design. These resources include a range of materials, and the tools, equipment and machines needed to transform these materials in a safe manner into useful products. Increasingly, the importance of environmental sustainability is having an impact on product design and development. More sustainable approaches are therefore at the forefront throughout the product lifecycle. Please note there is a materials cost for this subject.
Outcomes / Assessment:	The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4. In the study of Product Design and Technology students' level of achievement will be determined by School-assessed Coursework, School-assessed Task and an End-of-year examination. Students present a folio that documents the Product design process used while working as a designer to meet the needs of a client and/or an end-user, and commence production of the designed product. They safely apply a range of production skills and processes to make the product designed in Unit 3, and manage time and resources effectively and efficiently. On completion of their project students evaluate the outcomes of the design, planning and production activities, explain the product's design features to the client and/or an end-user and outline its care requirements.
Pathways:	VCE Product Design and Technology can provide a pathway to a range of related fields such as industrial, product, interior and exhibition design, engineering, and furniture, at both professional and vocational levels. Moreover, VCE Product Design and Technology can inform sustainable behaviours and develop technical skills to present multiple solutions to everyday life situations. It contributes to creating confident and unique problem solvers and project managers well equipped to deal with the multi-disciplinary nature of modern workplaces.

Psychology Units 3 & 4	
Rationale:	This course explores complex human behaviours and thought processes. It develops empathetic understandings and an understanding of mental health issues in society. Students are given the opportunity to apply psychological principles to everyday situations such as workplace and social relations. Psychology provides students with a sophisticated framework for understanding the complex interactions between biological, behavioural, cognitive and socio-cultural factors that influence thought, emotions and behaviour.
Learning Focus:	Unit 3 explores the relationships between consciousness and thoughts, feelings and behaviour by comparing the characteristics of normal waking consciousness with altered states of consciousness (including sleep). The Unit also studies the neural basis of memory and the connectivity between brain areas to explain the complexity of memory, factors that affect memory and its decline over time, and the cause of forgetfulness. Unit 4 studies the neural basis of learning, and examines different types of learning: classical conditioning, operant conditioning, observational learning, one-trial learning, trial and error learning, insight learning and latent learning. Students use a biopsychosocial framework to investigate how biological, psychological and sociocultural factors interact to contribute to the development of an individual's mental functioning and mental health. Students apply a biopsychosocial framework to the study a selected mental disorder.
Outcomes / Assessment:	Students studying Unit 3 and 4 Psychology will be expected to Satisfactorily fulfil 4 Learning Outcomes (two for each unit). They will achieve these outcomes through the completion of the following tasks: <ul style="list-style-type: none"> ▪ Report of a research investigation (ERA) ▪ Tests ▪ Annotated folio of practical activities ▪ Visual presentation The students will also sit an examination and the end of Unit 4.
Pathways:	The study of Psychology leads to opportunities in a range of careers that involve working with children, adults, families and communities in a variety of settings. Fields of applied psychology include educational, environmental, forensic, health, sport and organisational psychology. Specialist fields of psychology include counselling and clinical contexts, as well as neuropsychology, social psychology and developmental psychology.

Religious Education: Thomas Carr College Program (Religion & Arts)	
Rationale:	The world is the primary context and place of God's self-disclosure to all of humanity. It is in the lived reality of our daily lives that we are called to experience God as Creator, Jesus as Saviour and the Holy Spirit as Guide. The Catholic school is part of the world and part of the community of the Church and invites all the members of the school community to search for God in the world and to live a life framed by the life and words of Jesus.
Learning Focus:	This unique program focuses on the many ways in which music, art and film are used to express aspects of faith. The main focus is on the students' home tradition Catholicism with reference, to major religions of the world. Art always and everywhere has been a medium through which people have sought to express their religious belief. Students will compare and contrast some of the ways in which believers express their principal beliefs, ideas and teachings through creative and expressive art forms. Then, students will identify the emotions of awe, peace, joy and wonder which can be expressed through music. This unit enables students to learn and experience how the use of music can lead to stillness and silence. Students will recognise and express feelings in response to ways in which the religious experience is represented through film. Finally, students will conclude the year with a short course on Christian Meditation. Students will learn about the history and practice of Christian Meditation as a way of giving them a gift of prayer that they can draw on for the rest of their lives.
Outcomes / Assessment:	The primary purpose of assessment is to assist in better teaching and learning. Students will have three Formative Assessment Tasks and two Summative Unit Tests at the end of each term and an End of Year Examination. Assessment Task 1 – Visual Art Work, Assessment Task 2 - Creative Musical Response, Assessment Task 3 – Film Comparative Analysis, Assessment Task 4 – Meditation Session.
Pathways:	They develop the critical thinking skills of students essential for understanding religious and ethical issues. Further study in Theology or Religious Education can be done.

Religion & Society Units 3 & 4	
Rationale:	The beliefs, values and ideas of religious traditions can play an important part in shaping and maintaining culture. Religious beliefs about the nature of existence and the purpose of human life provide a frame of reference for understanding the world and for guiding daily personal and communal action. It aims to develop understanding and respect for the perceptions of the participants in religious traditions. It values and promotes open inquiry, without bias towards any one tradition.
Learning Focus:	<p>During Semester 1, students begin by studying the religious beliefs developed by one or more than one religious tradition in response to the big questions of life. They explore the ways in which these religious beliefs create meaning for religious traditions and their members. The religious beliefs of any religion arise from the beliefs held about ultimate reality, and these in turn inform particular beliefs about human existence; about its meaning, purpose and destiny.</p> <p>During Semester 2, students explore challenge and response in historical and contemporary contexts. Students investigate historical challenges to religious traditions arising internally and externally. They explore the challenge to religious traditions in contemporary pluralistic society for action on behalf of social justice and for assessment of new problems arising from social and technological change.</p>
Outcomes / Assessment:	<p>During Semester 1, students will cover three areas of study: Area Study One – Meaning in religious traditions, Area Study Two – Maintaining continuity of religious beliefs, Area Study Three – Significant life experience and religious belief.</p> <p>During Semester 2, students will cover two areas of study: Area Study One – Historical challenges to religious traditions, Area Study Two – Contemporary challenges and their impact.</p> <p>End of year Examination.</p>
Pathways:	Students could study the following: Sociology; Social Work; Counselling; Psychology; Theology; Education. A high study score in this subject will contribute to an ATAR score which could give you entry into a wide variety of Humanities and Social Sciences subjects.

Specialist Mathematics Units 3 & 4	
Rationale:	The study of Specialist Mathematics Units 3 and 4 is intended for those with strong interests in mathematics and those who wish to undertake further study in mathematics and related disciplines. Specialist Mathematics Units 3 and 4 are normally taken in conjunction with Mathematical Methods (CAS) Units 3 and 4, and the areas of study extend and develop material from Mathematical Methods (CAS) Units 3 and 4.
Learning Focus:	Students are expected to be able to apply techniques, routines and processes, involving rational, real and complex arithmetic, algebraic manipulation, diagrams and geometric constructions, solving equations, graph sketching, differentiation and integration related to the areas of study, as applicable, both with and without the use of technology. The appropriate use of technology to support and develop the teaching and learning of mathematics is to be incorporated throughout the units. This will include the use of some of the following technologies for various areas of study or topics: graphics calculators, spreadsheets, graphing packages, dynamic geometry systems and computer algebra systems. In particular, students are encouraged to use graphics calculators and other technologies both in the learning of new material and the application of this material in a variety of different contexts.
Outcomes / Assessment:	Students studying Units 3 and 4 Specialist Mathematics will be expected to do: Unit 3: SAC 1 Application task – Outcome 1 – 3 Unit 4: SAC 2 Modelling / Problem Solving Task (outcomes 1 – 3) SAC 3 Modelling / Problem Solving Task (outcomes 1 – 3)
Pathways:	Students can continue to study mathematics and related disciplines at university level.

Studio Arts Units 3 & 4	
Rationale:	VCE Studio Arts encourages and supports students to recognise their individual potential as art makers and presents a guided process to assist their understanding and development of art making. The study establishes effective art practices through the application of an individual design process to assist the student's production of a folio of artworks. The theoretical components of this study are an important basis for studio practice as it offers students a model for inquiry that can support their art making practices.
Learning Focus:	Unit 3 Studio production and professional art practices In Unit 3 the student uses an exploration proposal to define an area for the development of a visual Design process that is based on their individual concepts. The exploration proposal underpins the student's working process and is used as a reference for the development and reflection of the design process. This enables the student to establish an understanding about how to generate a range of potential directions for the production of possible future artworks. Unit 4 Studio production and art industry contexts In Unit 4 students develop their finished artworks based on selected directions. Students evaluate the use of materials, techniques and aesthetics. This unit also investigates aspects of artists' involvement in the art industry, focusing on a variety of exhibition spaces and the methods and considerations involved in the preparation, presentation and conservation of artworks. Students examine a range of environments for the presentation of artworks exhibited in contemporary settings. Students are expected to visit at least two different exhibition spaces in their current year of study.
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ A folio including design exploration, focus statements and finished artworks. ▪ Written Outcome theory tasks. ▪ End of Year Examination.
Pathways:	Employability skills gained from this study include: communication, planning, organising and teamwork skills. As well as problem solving, self-management and initiative skills. This study can also lead to a range of tertiary and vocational studies, such as those associated with multimedia, fine art, graphic and fashion design, the music industry, film and television, theatre and advertising.

Visual Communication & Design Units 3 & 4

Rationale:	The Visual Communication Design study examines the way visual language can be used to convey ideas, information and messages in the fields of communication, environmental and industrial design. Students employ a design process to generate and develop visual communications. The design process provides a structure to organise design thinking and is shaped by considerations of aesthetics and functionality, as well as social, environmental and economic factors. Students develop the skills to manipulate and organise design elements, design principles, selected media, materials and production methods when creating visual communications. Students have the opportunity to investigate the work and practices of Australian and international designers from a variety of social, cultural, historical and contemporary contexts.
Learning Focus:	Students create formal design briefs that allow them to explore the materials, methods, media and direction they are most interested in pursuing. In Unit 3 students gain an understanding of the process designers employ to structure their thinking and communicate ideas with clients, target audiences, other designers and specialists. Through practical investigation and analysis of existing visual communications, students gain insight into how the selection of methods, media, materials and the application of design elements and design principles can create effective visual communications for specific audiences and purposes. Having completed their brief and generated ideas in Unit 3, students continue the design process in Unit 4 by developing and refining concepts for each need stated in the brief. They utilise a range of digital and manual two- and three-dimensional methods, media and materials. They investigate how the application of design elements and design principles creates different communication messages with their target audience.
Outcomes / Assessment:	<ul style="list-style-type: none"> ▪ Analysis in practice - SAC ▪ Professional Practice – SAC ▪ The Design Brief, Generating Ideas and Final Presentations Folio - SAT ▪ The Pitch - SAC ▪ Written Examination.
Pathways:	At the conclusion of this course, the students are able to pursue a career in Design by applying to study at a tertiary institute or university. There are many different fields of design and many courses available.