VCE

Curriculum Handbook

2016
Dear Students,

The learning journey is a lifelong one, but a very significant part of it occurs in your final years of secondary schooling. During these years it is most important that you maximise your opportunities.

At this point of time some of you can see clearly ahead, know the path you wish to tread and the subjects and course of study you wish to follow.

If the road ahead is not clear, be assured you are not alone, as many students make career decisions during and after VCE. Ensure you choose as broad a range of subjects as possible, Ensure you base your decisions upon what you enjoy, your interests, what you are good at and any prerequisite subjects required with the guides of picking up subjects you enjoy, are interested in and good at, taking into account subject prerequisites. Consider carefully your study preference, but also choose one or two other subjects for balance.

Before you sign off on your course of study, check carefully with the School’s Career Counsellor and your House Dean. It is wise to keep other options open in case you change your mind and future direction.

Deciding upon a course of study that is best for you can at times be like encountering a fork in the road and being unsure of which road to take. It is critical, however, in your senior school years to be the one in the driver’s seat, the person in control and making the decisions. I recommend you listen to the advice of family and friends, but ultimately listen to your own voice within. Growing up and becoming independent means becoming responsible for your own decisions and life’s path.

At Kilvington we strongly believe in an education of the whole person – the academic, emotional, physical and spiritual – and producing young people of character. So I strongly encourage you to continue to involve yourself in as many aspects of school life as possible. Participate in sport, debating, public speaking, House Arts, the school production, choirs, musical groups, community service and other activities. Participation in these programs will add balance to your life, develop your character and significantly enhance your learning.

Over the next years you are in for quite a ride and your learning journey will be full of many exhilarating and enriching experiences. I look forward to sharing this journey with you.

Jon Charlton
Principal
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Kilvington Year 10 to 12 Program
The VCE program at Kilvington is designed to provide breadth of study through Units 1 and 2 and depth of study through Units 3 and 4. The usual program is for students to take at least 24 units of study consisting of:

- One VCE Unit 1 or 2 in Year 10 per Semester
- 6 VCE units per Semester at Unit 1 and 2, or 6 VCE units per Semester, including one Unit 3 and 4 sequence, in Year 11, and
- 5 VCE units per Semester in Year 12

In addition students should refer to the Subject Selection Policy which outlines further guidelines

The Victorian Certificate of Education (VCE)
Students in Senior School follow a program of study, which leads to the award of the Victorian Certificate of Education. The rules relating to the VCE are set by the Victorian Curriculum and Assessment Authority.

Each study in the VCE consists of four semester length units:
- Units 1 and 2 may in some studies be taken separately. Units 1 and 2 are assessed internally
- Units 3 and 4 must be taken as a sequence. Units 3 and 4 are assessed internally and externally

Satisfactory Completion of the VCE
To be awarded the VCE, students must satisfactorily complete at least 16 units of study. The 16 units of study must include:

- An approved combination of three units from the group of English studies
- Three sequences of units 3 and 4 in studies other than English

As there is a distinction between the requirements for the award of the VCE and what a student requires for tertiary entrance, the Kilvington program ensures that the students are well prepared for future study.

Planning Your Studies at VCE
Planning a VCE program is important and in order to provide breadth of study in Units 1 and 2, it is possible to take individual units in some study areas.

Exceptions to the commencement of study in unit 2 are:
- LOTE: French and Japanese
- Mathematical Methods
- General Mathematics (without any Mathematics studies in Unit 1)

English Studies
At Kilvington, students must complete Units 1 and 2 English and Units 3 and 4 English. To satisfy the English studies requirement for the award of the VCE, students must have satisfactorily completed three of these units. To gain entry to tertiary studies, students must have satisfactorily completed both Unit 3 and Unit 4 of their chosen English study. In exceptional circumstances, and if given permission from the English department, a student may choose to do Literature Units 3 and 4 rather than English Units 3 and 4.
Subject Selection Policy

Kilvington Grammar School promotes acceleration of student learning pathways dependent on student ability and application. Students are able to study VCE Units 1 and 2 in Year 10 and VCE Units 3 and 4 in Year 11 where they demonstrate proficiency, ability and aptitude in a subject area.

Kilvington Grammar School aims to ensure students are well advised when making subject selections and to aid this process, has developed clear guidelines to inform them of the requirements of the subject, subject choice and promotion into continuing years of study. In addition, please refer to the Year Level Progression Policy.

Subject Selection and Promotion

Entering Year 10:
As part of a Year 10 Program students may study one Units 1 and 2 VCE Subject (including accelerated Maths Methods or an external VCE or VET subject).

Subject Selection form:
- Needs to be signed by the student and parent
- Must be signed off by both the House Dean and Year 9 Coordinator for approval
- A copy of the Year 9 Semester One report and COR comments/marks for relevant subjects must be included

Prerequisite for VCE study in Year 10;
- Student needs to have results on key assessment tasks greater than 75% in the related subject
- Year 9 Science for VCE Psychology or Biology / Year 9 Maths for Maths Methods or Accounting / Year 9 PE/Health for VCE PE or HHD
- Please note that some subjects, such as PE, may have other prerequisite requirements
- Approval may be given for extenuating or special circumstances

Students for whom studying a VCE subject is not recommended will have a meeting with House Dean and Learning Support Co-ordinator, Counsellor or Careers Counsellor as required.

Under special circumstances, students wanting to study two or more Units 1 and 2 VCE Subjects (internally and/or externally) must fill out the Application Form for Enrolment in Multiple Units 1 and 2 Studies and will meet with House Dean to sign off approval.

Students should have an overall score of at least 90% in relevant subjects to study multiple VCE subjects.

Entering Year 11
A recommended Year 11 Program is to study six VCE subjects, which may include one VCE Units 3 and 4 subject (internally or externally)

Subject selection form;
- Needs to be signed by the student and parent
- Must be signed off by the House Dean for approval
- A copy of the Year 10 Semester One report and COR comments/marks for relevant subjects must be included

A Year 10 or 11 student who receives an 'N' for a Unit 1 or 2 but wants to continue with Units 3 and 4, will meet with parent/s and Careers Counsellor and Head of Senior School.

Under special circumstances, students wanting to study 2 or more Units 3 and 4 VCE Subjects (internally and/or externally) must fill out the Application Form for Enrolment in Multiple Units 3 and 4 Studies and will meet with the Careers Counsellor to sign off approval.
**Entering Year 12**
As part of a Year 12 Program, students may study up to five VCE subjects.

**Subject Selection form:**
- Needs to be signed by the student and parent
- Must be signed off by the House Dean for approval
- A copy of the Year 11 Semester One report must be included

A Year 11 student who receives an 'N' for a Unit 1 or 2 but wants to continue with Units 3 and 4, will meet with parent/s and Careers Counsellor and Head of Senior School.

**Monitoring Progress**
The VCE Coordinator monitors all VCE students and together with teachers identifies students at risk of getting an 'N' for a Unit.

Following this, the VCE Coordinator will work with the subject teacher to determine the requirements of the student in order to achieve an 'S' for that Unit. Parents are notified by letter of these requirements.

Students for whom continued study in a particular VCE subject is not recommended will meet with House Dean and Learning Support, Co-ordinator, Counsellor or Careers Counsellor as required.

Students intending to not study a full load or follow a different pathway (e.g. VCE over 3 years) will meet with Careers Counsellor (then House Dean if pastoral counselling is required) and Head of Senior School to sign off approval. Parents are involved in this process and decision.
# Subjects

## Unit 1 – 4 Studies On Offer in 2016 for Students in Years 11 and 12

<table>
<thead>
<tr>
<th>Units 1 and 2</th>
<th>Units 3 and 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>Accounting</td>
</tr>
<tr>
<td>Biology</td>
<td>Biology</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Business Management</td>
</tr>
<tr>
<td>Drama</td>
<td>Chemistry</td>
</tr>
<tr>
<td>English/EAL</td>
<td>English/EAL</td>
</tr>
<tr>
<td>Food and Technology</td>
<td>Food and Technology</td>
</tr>
<tr>
<td>Geography</td>
<td>Geography</td>
</tr>
<tr>
<td>Health and Human Development</td>
<td>Health and Human Development</td>
</tr>
<tr>
<td>History (Twentieth Century)</td>
<td>History (Revolutions)</td>
</tr>
<tr>
<td>Information Technology: Computing</td>
<td>Information Technology: Informatics</td>
</tr>
<tr>
<td>Legal Studies</td>
<td>Legal Studies</td>
</tr>
<tr>
<td>LOTE: French</td>
<td>LOTE: French</td>
</tr>
<tr>
<td>LOTE: Japanese</td>
<td>LOTE: Japanese</td>
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<tr>
<td>Literature</td>
<td>Literature</td>
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<tr>
<td>General Mathematics</td>
<td>Further Mathematics</td>
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<tr>
<td>Specialist Mathematics</td>
<td>Specialist Mathematics</td>
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<tr>
<td>Mathematical Methods</td>
<td>Mathematical Methods</td>
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<tr>
<td>Media</td>
<td>Media</td>
</tr>
<tr>
<td>Music Performance</td>
<td>Physics</td>
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<tr>
<td>Physics</td>
<td>Physical Education</td>
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<tr>
<td>Physical Education</td>
<td>Psychology</td>
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<tr>
<td>Psychology</td>
<td>Studio Arts</td>
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<tr>
<td>Studio Arts</td>
<td>Theatre Studies</td>
</tr>
<tr>
<td>Visual Communication Design</td>
<td>Visual Communication Design</td>
</tr>
</tbody>
</table>

While we endeavour to meet students’ preferences, this may not always be possible due to limitation of class size and timetables.
Subject Options

VET in the VCE (Vocational Education and Training in Schools)
All VET in the VCE programs have full VCE study status, and contribute as units towards the satisfactory completion of the VCE. Up to eight of the units required to satisfactorily complete the VCE may be VET in the VCE units obtained across two VET programs. On successful completion of study, students are awarded their VCE as well as the VET in the VCE Certificate.

VET in the VCE provides additional breadth to the VCE and gives students a nationally recognised training credential endorsed by industry. Some of the programs studied in the past by students are:

- Hospitality
- Multimedia

The qualifications are comprised of units of competence. Each of the units of competence is expressed in terms of elements and their associated performance criteria. Demonstration of each of these is required for satisfactory completion of the Certificate. In order to gain the award, students must achieve all the elements in each unit of competence in accordance with the prescribed assessment requirements. Please see the VCE Coordinator for further details about the Certificates.

LOTE: External Studies
Students may study a LOTE not offered by the School as an external study. A LOTE study contains four units, with Units 3 and 4 taken as a sequence.

Students may study the LOTE through the Victorian School of Languages. It is the students’ responsibility to enrol at the relevant location. They will attend classes at another location, however Kilvington is responsible for registration of the study for the Victorian Curriculum and Assessment Authority records. Should a student wish to study an external LOTE, they must indicate this intention on the VCE Subject Planner. This will then be discussed with the VCE Coordinator as part of the overall planning for subject selection.

University Extension Studies
High achieving Year 12 students who have completed a Unit 3 and 4 sequence in Year 11 may be eligible for enrolment in a University extension study. This enables a student to undertake a first year university subject, whilst completing VCE. Credit can be gained towards a first year degree course. Completion of a first year university subject contributes as an increment to the ATAR (Australian Tertiary Admission Rank). Very able Year 10 students may wish to bear this in mind when planning a total program of study for Years 11 and 12.

Further Opportunities
Senior School students are required to participate in the Kilvington Senior School general education program which includes:

- Pastoral Care
- Physical Education
- House Activities
- Careers Education
- Senior School Camps
**Assessment and Reporting**

**Satisfactory Completion of VCE Units**
Each VCE unit includes a number of outcomes. These outcomes must be achieved for satisfactory completion of the unit.

In accordance with Victorian Curriculum and Assessment Authority requirements, the subject teacher determines satisfactory completion of a unit. At Kilvington it is expected students attend all timetabled classes for the satisfactory completion of the unit.

**Assessment of Units 1 and 2**
VCE Units 1 and 2 offered at Kilvington will be assessed in two ways:

- Each Outcome in a unit will be assessed as Satisfactory (S) or Not Satisfactory (N). For a unit as a whole to be satisfactorily completed, all the Outcomes must receive an S.
- Marks indicating the level of achievement/performance reached in aspects of each study are reported in the Parent Portal. These are internal grades and are not reported to the Victorian Curriculum and Assessment Authority.

**Assessment of Units 3 and 4**
Each Outcome in a unit will be assessed as Satisfactory (S) or Not Satisfactory (N). For a unit as a whole to be satisfactorily completed, all the Outcomes must receive an S.

The Victorian Curriculum and Assessment Authority assess all students undertaking Units 3 and 4.

Units 3 and 4 have three assessment components: either one school assessment and two examinations or two school assessments and one examination. Each assessment is reported as grades A+ to E; UG (ungraded). Examination grades and school assessment grades are reported separately.

**Reporting**
There will be scheduled parent/teacher interviews during the year and assessment feedback and progress information regularly entered via COR into the Parent Portal.

At the end of each Semester students in Year 10 and 11 will receive a Semester Report Summary. Students in Year 12 will receive a written report summary at the end of Semester 1.

**Study Scores**
Students’ overall achievements for each study at Unit 3 and 4 are calculated and reported as a study score (relative position) on a scale of 0 to 50. In order to qualify for a study score, a student must have satisfactorily completed both Units 3 and 4 in that study.

On completion of the VCE, Year 12 students receive the following from the Victorian Curriculum and Assessment Authority:

- A cumulative Statement of Results listing all VCE units undertaken over any year level. Study Scores for Unit 3 and 4 sequences are listed.
- A Summary Statement of Grades giving the grades obtained in Assessment Components for Units 3 and 4
- The Victorian Certificate of Education
- General Achievement Test (GAT) statement
**Tertiary Entrance**

The minimum requirement for all tertiary institutions is the satisfactory completion of the VCE, however each university or TAFE course has individual requirements that must be met for tertiary entrance. These may include a particular ATAR score, or having an interview, or submitting a folio of work. It may also involve doing particular VCE subjects. These are known as prerequisite subjects. **It is important that prerequisite studies be considered by students when choosing their VCE studies.**

VTAC (Victorian Tertiary Admissions Centre) is the body responsible for coordinating students’ requests for tertiary entrance and their offers. VTAC offers a comprehensive website, that all students should use before choosing VCE subjects. The site has a number of important functions and services that should be explored.

These are:

- **The VICTER** – It is designed for Year 11 and 10 students who are considering a VCE study and need to check requirements for tertiary entrance. Please be aware that as the VICTER is published three years ahead of the year the students start tertiary studies there are often changes to what universities and TAFEs offer and the requirement that they insist upon.

- **The VTAC Guide** - this is distributed in Term 3, in hard copy, to all students in Year 12. This document is designed for the current Year 12 students.

- **Course search** – this is an online program designed to facilitate students finding tertiary courses that suit their interests. It is linked into their VCE program and is accessed using the first four digits in their birth date and their VCAA candidate number.

- **Course ATARS** (Australian Tertiary Admission Rank) from the previous year.

- **Subject scaling** for the previous year. Scaling is the process that adjusts raw study scores to allow for differences in the difficulties of the various VCE studies. This process is mathematically determined by comparing the results of raw scores from various studies. Some subjects therefore end up with a higher scaled study score and others have a lower scaled study score. Most subjects have very little change if any.
### Key Assessment Tasks: Unit 1 and 2

The following tables outline the assessment tasks for VCE units studied from year 10-12. Procedures for the assessment of levels of achievement in Units 1 and 2 are the responsibility of VCE teachers. Assessment tasks are selected from a range of options as stated in the Study Design for each VCE subject.

**All Unit 1 and 2 studies have an examination at the end of each semester.**

<table>
<thead>
<tr>
<th>Study</th>
<th>Unit 1</th>
<th>Unit 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>Practical Reports, Research Report, Tests</td>
<td>Practical Reports, Field Trip Report, Tests</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Practical Reports, Research Assignment, Tests</td>
<td>Practical Reports, Research Assignment, Tests</td>
</tr>
<tr>
<td>Drama</td>
<td>A journal that combines hard and soft copy components, Performance of a solo and/or ensemble devised drama work/s that features stories and characters, Analysis of the drama work created and performed in Outcomes 1 and 2, Written analysis of a drama performance</td>
<td>A journal that combines hard and soft copy components, Performance of a solo and/or ensemble devised drama work/s that features stories and characters, Analysis of the drama work created and performed in Outcomes 1 and 2, Written analysis of a drama performance</td>
</tr>
<tr>
<td>English/EAL</td>
<td>Reading and Responding Essays, Creating and Presenting Essays, Using Language to Persuade - Oral</td>
<td>Reading and Responding Essays, Creating and Presenting Essays, Using Language to Persuade - Essay</td>
</tr>
<tr>
<td>Food and Technology</td>
<td>Planning/Production Records, Production Work, Written Reports, Tests: Practical and Written</td>
<td>Planning/Production Records, Production Work, Written Reports, Tests: Practical and Written</td>
</tr>
<tr>
<td>General Mathematics</td>
<td>Topic tests, Analysis and application tasks</td>
<td>Topic tests, Analysis and application tasks</td>
</tr>
<tr>
<td>Specialist Mathematics</td>
<td>Topic tests, Analysis and application tasks</td>
<td>Topic tests, Analysis and application tasks</td>
</tr>
<tr>
<td>Geography</td>
<td>Field Work, Research Report, Data Processing Analysis</td>
<td>Field Work, Research Report, Data Processing Analysis</td>
</tr>
<tr>
<td>Health and Human Development</td>
<td>Outcome Tests, Written Reports, Data Analysis</td>
<td>Outcome Tests, Written Reports, Case Studies</td>
</tr>
<tr>
<td>Legal Studies</td>
<td>Case Studies, Media Folio, Extended response questions, Topic Test</td>
<td>Case Studies, Media Folio, Extended response questions, Topic Tests</td>
</tr>
<tr>
<td>LOTE: French</td>
<td>Oral Task, Listening Task, Writing Task, Reading Task, Grammar Test</td>
<td>Oral Task, Listening Task, Writing Task, Reading Task, Grammar Test</td>
</tr>
</tbody>
</table>
### Key Assessment Tasks: Unit 1 and 2 (Cont’d)

<table>
<thead>
<tr>
<th>Study</th>
<th>Unit 1</th>
<th>Unit 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTE: Japanese</td>
<td>• Informal Conversation</td>
<td>• Role-Plays</td>
</tr>
<tr>
<td></td>
<td>• Writing Piece</td>
<td>• Journal Writing</td>
</tr>
<tr>
<td></td>
<td>• Aural Comprehension Tasks</td>
<td>• Aural Comprehension Tasks</td>
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<tr>
<td></td>
<td>• Written Comprehension Tasks</td>
<td>• Written Comprehension Tasks</td>
</tr>
<tr>
<td></td>
<td>• Oral Reviews</td>
<td>• Written Reviews</td>
</tr>
<tr>
<td></td>
<td>• Essays</td>
<td>• Essays</td>
</tr>
<tr>
<td></td>
<td>• Film Analyses</td>
<td>• Creative Responses</td>
</tr>
<tr>
<td>Literature</td>
<td>• Aural Comprehension Tasks</td>
<td>• Aural Comprehension Tasks</td>
</tr>
<tr>
<td></td>
<td>• Written Comprehension Tasks</td>
<td>• Written Comprehension Tasks</td>
</tr>
<tr>
<td>Mathematical Methods</td>
<td>• Topic tests</td>
<td>• Topic tests</td>
</tr>
<tr>
<td></td>
<td>• Analysis and application tasks</td>
<td>• Analysis and application tasks</td>
</tr>
<tr>
<td>Media</td>
<td>• Media Folio</td>
<td>• Media Folio</td>
</tr>
<tr>
<td></td>
<td>• Tests</td>
<td>• Tests</td>
</tr>
<tr>
<td></td>
<td>• Written Responses</td>
<td>• Written Responses</td>
</tr>
<tr>
<td></td>
<td>• Oral Reports</td>
<td>• Oral Reports</td>
</tr>
<tr>
<td>Music Performance</td>
<td>• Performance</td>
<td>• Performance</td>
</tr>
<tr>
<td></td>
<td>• Analysis and Evaluation Tasks</td>
<td>• Presentations</td>
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<td></td>
<td>• Presentations</td>
<td>• Practical Work</td>
</tr>
<tr>
<td>Physical Education</td>
<td>• Tests</td>
<td>• Tests</td>
</tr>
<tr>
<td></td>
<td>• Laboratory Reports</td>
<td>• Laboratory Reports</td>
</tr>
<tr>
<td></td>
<td>• Oral Presentations</td>
<td>• Oral Presentations</td>
</tr>
<tr>
<td></td>
<td>• Report Writing</td>
<td>• Report Writing</td>
</tr>
<tr>
<td>Physics</td>
<td>• Practical Investigation</td>
<td>• Folio of practical activities</td>
</tr>
<tr>
<td></td>
<td>• Short Tests</td>
<td>• Short Tests</td>
</tr>
<tr>
<td></td>
<td>• Multimedia Presentation</td>
<td>• Data analysis</td>
</tr>
<tr>
<td>Psychology</td>
<td>• Practical Investigation</td>
<td>• Practical Investigation</td>
</tr>
<tr>
<td></td>
<td>• Tests</td>
<td>• Tests</td>
</tr>
<tr>
<td></td>
<td>• Presentations</td>
<td>• Presentations</td>
</tr>
<tr>
<td>Studio Arts</td>
<td>• Written Reports</td>
<td>• Written Reports</td>
</tr>
<tr>
<td></td>
<td>• Oral Reports</td>
<td>• Oral Reports</td>
</tr>
<tr>
<td></td>
<td>• Visual Communication</td>
<td>• Visual Communication</td>
</tr>
<tr>
<td>Visual Communication and Design</td>
<td>• Presentations</td>
<td>• Folios</td>
</tr>
<tr>
<td></td>
<td>• Practical Work</td>
<td>• Written Report and Presentation</td>
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<td></td>
<td>• Tests</td>
<td>• Tests</td>
</tr>
<tr>
<td></td>
<td>• Visual Communication</td>
<td>• Tests</td>
</tr>
</tbody>
</table>
### Assessment Structure for VCE Studies: Unit 3 and 4

<table>
<thead>
<tr>
<th>Study</th>
<th>School Assessment</th>
<th>External Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accounting</strong></td>
<td>Units 3&amp;4 Coursework</td>
<td>Written Examination: Nov (1.5 hours)</td>
</tr>
<tr>
<td><strong>Biology</strong></td>
<td>Unit 3 &amp; 4 Coursework</td>
<td>Written Examination: Nov (2.5 hours)</td>
</tr>
<tr>
<td><strong>Business Management</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td>Unit 3&amp;4 Coursework</td>
<td>Written Examination: Nov (2.5 hours)</td>
</tr>
<tr>
<td><strong>English/EAL</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (3 hours)</td>
</tr>
<tr>
<td><strong>Food and Technology</strong></td>
<td>Unit 3&amp;4 Coursework</td>
<td>Written Examination: Nov (1.5 hours)</td>
</tr>
<tr>
<td><strong>Geography</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>Health and Human Development</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>History (Revolutions)</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>Information Technology: Informatics</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>Legal Studies</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>Literature</strong></td>
<td>Unit 3 Coursework</td>
<td>Written Examination: Nov (2 hours)</td>
</tr>
<tr>
<td><strong>LOTE: Japanese French</strong></td>
<td>Unit 3 Coursework</td>
<td>Oral Examination: Nov (3 hours)</td>
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<tr>
<td><strong>Further Mathematics</strong></td>
<td>Units 3&amp;4 Coursework</td>
<td>Written Examination: Nov (1.5 hours)</td>
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<td>School-assessed Task 1 School-assessed Task 2</td>
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<td><strong>Visual Communication and Design</strong></td>
<td>Unit 3 Coursework School-Assessed Task</td>
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Unit 1
Establishing and Operating a Service Business

Unit Description
This unit focuses on the establishment of a small business and the accounting and financial management of the business. Students are introduced to the processes of gathering, recording, reporting and analysing financial data and information used by internal and external users. Recording and reporting is restricted to the cash basis.

Students examine the role of accounting in the decision-making process using single entry recording of financial data and information for the owner of a service 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.

Areas of Study
1. Going into business
   A potential small business owner needs to make many decisions before commencing the operations of the business. Students will investigate:
   - Forms of business ownership, including sole trader, partnership and companies
   - Reasons for establishing a small business
   - Factors that lead to the success or failure of a small business
   - The role of professionals, such as accountants, business advisors and professional organisations in providing advice to achieve business success
   - Internal and external sources of finance including features, advantages and disadvantages
   - Resources needed to establish a small business

2. Recording and reporting accounting data and information
   In this area of study students investigate the role of accounting in the generation of financial data and information for the owner of a service business. The focus is on the recording and reporting of financial data and information using a single entry recording system. Students are required to use both manual and ICT methods in the recording and reporting process.

   This knowledge includes:
   - Accounting principles and qualitative characteristics of accounting information
   - Definition of the accounting elements: assets, liabilities, owner’s equity, revenue and expenses
   - The accounting equation
   - Classification of current and non-current items in the balance sheet
   - The two-fold effect of transactions on the balance sheet
   - Source and business documents for a service business: cash receipts, cheque butts,memos, bank statements, invoices
   - Techniques for the recording of cash receipts and payments from source documents, including the recording of the Goods and Services Tax (GST) where the amount of the GST is identified
   - Special journals: cash receipts and cash payments
   - Internal control procedures, including cash control and the bank reconciliation process
   - Accounting reports
   - Cash budgeting

Unit Outcomes
On completion of this unit the student should be able to:
- Describe the resources and explain and apply the knowledge and skills necessary to set up a small business
- Identify, record, report and explain the financial data and information for the owner of a service business, using a combination of manual and ICT methods
Unit 2
Accounting for a Trading Business

Unit Description
This unit focuses on accounting for a single activity sole trader. Using the accrual approach, students use a single entry recording system for the recording and reporting of cash and credit transactions stock. They use financial and non-financial information to evaluate the performance of a business. Using these evaluations, students 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.

Areas of Study
In Unit 2 there are 3 Areas of Study:
1. Recording Financial Data and Reporting Accounting Information
2. ICT in Accounting
3. Evaluation of Business Performance

Unit Outcomes
On completion of this unit the student should be able to:
- Record and report financial data and information for a sole trader
- Record and report financial data and information using an accounting software package for a single activity sole trader
- Explain and evaluate the role of ICT in the accounting process
- Select and use financial and non-financial information to evaluate a business
- Suggest strategies that will improve business performance
Units 3 and 4 are designed to be taken as a sequence.

Unit 3 focuses 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 are introduced to the double entry system of recording using the accrual basis of accounting. The perpetual method of stock recording with the First In, First Out (FIFO) method is used.

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.

Areas of Study
In Unit 3 there are 2 Areas of Study:
1. Recording Financial Data
2. Balance – day Adjustments and reporting and interpreting accounting information

Unit Outcomes
On completion of this unit the student should be able to:
- Record financial data into appropriate accounting records using a double entry accrual-based system for a single activity sole trader
- Explain related aspects of the double entry accrual-based accounting system
- Record balance day adjustments
- Prepare financial reports
- Explain related aspects of the accounting system
Unit Description
This unit provides an extension of the recording and reporting processes from Unit 3 and the use of financial and non-financial information in assisting management in the decision-making process.

Unit 4 covers the accrual recording and reporting system for a single activity trading business using the perpetual inventory recording system.

Students learn about the role and importance of budgeting for the business and undertake the practical completion of budgets for cash, financial performance and financial position. In this unit students evaluate the information prepared and analyse the results in order to suggest strategies to the owner.

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.

Areas of Study
In Unit 4 there are 2 Areas of Study:
1. Extension of Reporting and Recording
2. Financial planning and decision-making

Unit Outcomes
On completion of this unit the student should be able to:
- Record and report financial data and information using a double entry accrual-based system for a single activity sole trader
- Explain related aspects of this accounting system
- Prepare and analyse budgets
- Evaluate a business using financial and non-financial information
- Suggest strategies to improve the profitability and liquidity of the business
Biology

Unit 1
How do Living Things Stay Alive?

Unit Description
In this unit students are introduced to some of the challenges to an organism in sustaining life. Students examine the cell as the structural and functional unit of life, from the single celled to the multicellular organism, and the requirements for sustaining cellular processes in terms of inputs and outputs. They analyse types of adaptations that enhance the organism’s survival in a particular environment and consider the role homeostatic mechanisms play in maintaining the internal environment. Students investigate how a diverse group of organisms form a living interconnected community that is adapted to, and utilises, the abiotic resources of its habitat. The role of a keystone species in maintaining the structure of an ecosystem is explored. Students consider how the planet’s biodiversity is classified and the factors that affect the growth of a population.

Areas of Study
1 How do organisms function?
   Students will investigate and explain how cellular structures and systems function to sustain life. Although the internal structure of a cell varies, all cells require a relatively stable internal environment for optimal functioning. Whether life forms are unicellular or multicellular, or heterotrophic or autotrophic, whether they live in a deep ocean trench, a tropical rain forest, an arid desert or on the highest mountain peak, all individual organisms are faced with the challenge of obtaining nutrients and water, exchanging gases, sourcing energy and having a means of removal of waste products. In particular, they will look at:
   - Cell size, structure and function
   - The structure and function of the cell membrane
   - Energy transformations in respiration and photosynthesis
   - Organ systems in the human body

2 How do living systems sustain life?
   In this area of study students examine the structural, physiological and behavioural adaptations of a range of organisms that enable them to survive in a particular habitat and to maintain a viable population size over time. Students consider the distinction between the external and internal environment of an organism and examine how homeostatic mechanisms maintain the internal environment within a narrow range of values for factors including temperature, blood glucose and water balance. They explore the importance and implications of organising and maintaining biodiversity and examine the nature of an ecosystem in terms of the network of relationships within a community of diverse organisms. Students identify a keystone species, explore an organism’s relationship to its habitat and evaluate the impact of abiotic factors on the distribution and abundance of organisms within the community. Factors affecting population size and growth are analysed. In particular, they will look at:
   - Survival through adaptations and regulation
   - Organising biodiversity
   - Relationships between organisms within an ecosystem

3 Practical Investigation
   The investigation requires the student to develop a question, plan a course of action to answer the question, undertake an investigation to collect the appropriate primary qualitative and/or quantitative data, organise and interpret the data and reach a conclusion in response to the question

Unit Outcomes
On completion of this unit the student should be able to:
- Investigate and explain how cellular functions and systems function to sustain life
- Explain how various adaptations enhance the survival of an individual organism, investigate the relationships between organisms that form a living community and their habitat, and analyse the impacts of factors that affect population growth
- Complete an extended practical investigation
### Biology

#### Unit 2

**How is Continuity of Life Maintained?**

**Unit Description**

In this unit students focus on cell reproduction and the transmission of biological information from generation to generation. Students learn that all cells are derived from pre-existing cells through the cell cycle. They examine the process of DNA replication and compare cell division in both prokaryotic and eukaryotic organisms. Students explore the mechanisms of asexual and sexual reproductive strategies, and consider the advantages and disadvantages of these two types of reproduction. The role of stem cells in the differentiation, growth, repair and replacement of cells in humans is examined, and their potential use in medical therapies is considered.

**Areas of Study**

1. **How does reproduction maintain the continuity of life?**
   
   In this area of study students consider the need for the cells of multicellular organisms to multiply for growth, repair and replacement. They examine the main events of the cell cycle in prokaryotic and eukaryotic cells. Students become familiar with the key events in the phases of the cell cycle, and focus on the importance of the processes involved in a cell's preparation for cell division. Students investigate and use visualisations and modelling to describe the characteristics of each of the phases in mitosis. Cytokinesis is explained for both plant and animal cells. Students describe the production of gametes in sexual reproduction through the key events in meiosis and explain the differences between asexual and sexual reproduction in terms of the genetic makeup of daughter cells. Students consider the role and nature of stem cells, their differentiation and the consequences for human prenatal development and their potential use to treat injury and disease. In particular, students will focus on:
   - The cell cycle
   - Asexual and sexual reproduction
   - Cell growth and cell differentiation, including the use of stem cells

2. **How is inheritance explained?**
   
   In this area of study students build on their understanding of the nature of genes and the use of genetic language to read and interpret patterns of inheritance and predict outcomes of genetic crosses. Students apply their genetic knowledge to consider the social and ethical implications of genetic applications in society. In particular, they will look at:
   - Genomes, genes and alleles
   - Chromosomes
   - Genotypes and phenotypes
   - Pedigree charts, genetic cross outcomes and genetic decision-making

3. **Investigation of an issue**
   
   In this area of study students apply and extend their knowledge and skills developed in Areas of Study 1 and/or 2 to investigate an issue involving reproduction and/or inheritance. They communicate the findings of their investigation and explain the biological concepts, identify different opinions, outline the legal, social and ethical implications for the individual and/or species and justify their conclusions. Material for the investigation can be gathered from laboratory work, computer simulations and modelling, literature searches, global databases and interviews with experts.

**Unit Outcomes**

On completion of this unit the student should be able to:

- Compare the advantages and disadvantages of asexual and sexual reproduction, explain how changes within the cell cycle may have an impact on cellular or tissue system function and identify the role of stem cells in cell growth and cell differentiation and in medical therapies
- Apply an understanding of genetics to describe patterns of inheritance, analyse pedigree charts, predict outcomes of genetic crosses and identify the implications of the uses of genetic screening and decision making related to inheritance
- Investigate and communicate a substantiated response to a question related to an issue in genetics and/or reproductive science
**Unit Description**
In this unit students consider the molecules and biochemical processes that are indicators of life. They investigate the synthesis of biomolecules and biochemical processes that are common to autotrophic and heterotrophic life forms. Students consider the universality of DNA and investigate its structure; the genes of an organism, functions of DNA and the code for the reproduction of a diverse range of proteins in an organism.

**Areas of Study**

1. **Molecules of life:**
   - The chemical nature of cells:
     ~ Synthesis of biomacromolecules. Identify monomers and polymers
     ~ Structure and function of lipids
     ~ Structure and function of DNA and RNA
     ~ Structure and functional diversity of proteins
   - The role of organelles including nuclear, ribosomes, endoplasmic reticulum, golgi apparatus and vesicles packaging and transport, import and export of biomolecules
   - The role of the plasma membrane
   - The nature of biochemical processes:
     ~ Enzymes as organic catalysts; catabolic and anabolic reactions
     ~ Energy requirements of cells
     ~ Energy transformation – photosynthesis and respiration

2. **Detecting and Responding:**
   - Co-ordination and regulation:
     ~ Roles of nervous and endocrine systems
     ~ Signal transduction and stimulus – response model
     ~ Signalling molecules
   - Detecting self and non self molecules, antigens and their sources
   - Physical and chemical barriers to infection in plants and animals
   - Immune response:
     ~ Structure and overall function of the lymphatic system
     ~ Non-specific, inflammatory response, phagocytosis, blood clotting
     ~ Specific immune response (cell mediated and humoral immunity)
   - Disorders of immune response
   - Acquired immunity, natural and artificial, vaccines and vaccinations

**Unit Outcomes**
On completion of this unit the student should be able to:
- Analyse and evaluate evidence from practical investigations related to biochemical processes
- Describe and explain coordination and regulation of an organism’s immune responses to antigens at the molecular level
Unit Description
In this unit students examine evidence for evolution of life forms over time. Students explore hypotheses that explain how changes to species have come about. In addition to observable similarities and differences between organisms, students explore the universality of DNA and conservation of genes as evidence for ancestral lines of life that have given rise to the present biodiversity of our planet.

Areas of Study
1. Heredity:
   • Molecular genetics
   • Tools and techniques
   • Transmission of heritable characteristics
   • Cell reproduction and DNA
   • Variation and Mutations
   • Patterns of inheritance

2. Change over time:
   • Change in populations, gene pool and genetic drift
   • Natural selection as a mechanism of evolution
   • Evidence of evolution
   • Patterns of evolution
   • The development of evolutionary theory
   • Evolutionary relationship
   • Hominin evolution: characteristics and trends
   • Human intervention in evolutionary processes:
     ~ Selective breeding
     ~ Application of biotechnology

Unit Outcomes
On completion of this unit students should be able to:
• Analyse the evidence for the molecular basis of heredity and patterns of inheritance
• Analyse and evaluate evidence of evolutionary change and evolutionary relationships, and describe mechanisms for change including the effect of human intervention on evolutionary processes
Biology

Unit 3 2017
How do Cells Maintain Life?

Unit Description
In this unit students investigate the workings of the cell from several perspectives. They explore the importance of the insolubility of the plasma membrane in water and its differential permeability to specific solutes in defining the cell, its internal spaces and the control of the movement of molecules and ions in and out of such spaces. 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.

Areas of Study
1. How do cellular processes work?
   In this area of study students focus on the cell as a complex chemical system. They examine the chemical nature of the plasma membrane to compare how hydrophilic and hydrophobic substances move across it. They model the formation of DNA and proteins from their respective subunits. The expression of the information encoded in a sequence of DNA to form a protein is explored and the nature of the genetic code outlined. Students use the lac operon to explain prokaryotic gene regulation in terms of the ‘switching on’ and ‘switching off’ of genes. The following topics are explored:
   - Plasma membranes
   - Nucleic acids and proteins
   - Gene structure and regulation
   - Structure and regulation of biochemical pathways
   - Photosynthesis
   - Cellular respiration

2. How do cells communicate?
   In this area of study students focus on how cells receive specific signals that elicit a particular response. Students apply the stimulus-response model to the cell in terms of the types of signals, the position of receptors, and the transduction of the information across the cell to an effector that then initiates a response. Students examine unique molecules called antigens and how they elicit an immune response, the nature of immunity and the role of vaccinations in providing immunity. They explain how malfunctions in signalling pathways cause various disorders in the human population and how new technologies assist in managing such disorders. The students investigate the following:
   - Cellular signals
   - The stimulus-response model
   - Responding to antigens
   - Immunity

Unit Outcomes
On completion of this unit the student should be able to:
- Explain the dynamic nature of the cell in terms of key cellular processes including regulation, photosynthesis and cellular respiration, and analyse factors that affect the rate of biochemical reactions
- Apply a stimulus-response model to explain how cells communicate with each other, outline human responses to invading pathogens, distinguish between the different ways that immunity may be acquired, and explain how malfunctions of the immune system cause disease
Biology

Unit 4 2017
How does life change and respond to challenges over time?

Unit Description
In this unit 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.

Areas of Study
1. How are species related?
   In this area of study students focus on changes to genetic material over time and the evidence for biological evolution. They investigate how changes to genetic material lead to new species through the process of natural selection as a mechanism for evolution. Students examine how evolutionary biology and the relatedness of species is based upon the accumulation of evidence. They learn how interpretations of evidence can change in the light of new evidence as a result of technological advances, particularly in molecular biology. The human fossil record is explored to identify the major biological and cognitive trends that have led to a complex interrelationship between biology and culture. In particular, the following areas are studied:
   - Changes in the genetic makeup of a population
   - Changes in biodiversity over time
   - Determining relatedness between species
   - Human evolution

2. How do humans impact on biological processes?
   In this area of study students examine the impact of human culture and technological applications on biological processes. They apply their knowledge of the structure and function of the DNA molecule to examine how molecular tools and techniques can be used to manipulate the molecule for a particular purpose. Students describe gene technologies used to address human issues and consider their social and ethical implications. Scientific knowledge can both challenge and be challenged by society. The areas explored are:
   - DNA manipulation
   - gene cloning, genetic screening and DNA profiling
   - the distinction between genetically modified and transgenic organisms and their use in society
   - strategies that deal with the emergence of new diseases in a globally connected world

3. Practical investigation
   A student-designed or adapted investigation related to cellular processes and/or biological change and continuity over time is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4. The investigation is to relate to knowledge and skills developed across Units 3 and 4 and may be undertaken by the student through laboratory work and/or fieldwork

Unit Outcomes
On completion of this unit the student should be able to:
- analyse evidence for evolutionary change, explain how relatedness between species is determined, and elaborate on the consequences of biological change in human evolution
- describe how tools and techniques can be used to manipulate DNA, explain how biological knowledge is applied to biotechnical applications, and analyse the interrelationship between scientific knowledge and its applications in society
- design and undertake an investigation related to cellular processes and/or biological change and continuity over time, and present methodologies, findings and conclusions in a scientific poster
Unit Description
In this unit students investigate how large-scale organisations operate. Students examine the context in which they conduct their business, focus on aspects of their internal environment and then look at the operations management function. Students develop and understanding of the complexity and challenge of managing large organisations and have the opportunity to compare theoretical perspectives with practical applications.

Areas of Study
1. Large-scale organisations in context
   Large-scale organisations are important for the Australian economy in creating employment, wealth and income. Every large-scale organisation operates within a unique context, characterised by its internal and external environment. In this area of study, students examine the importance of large-scale organisations to the Australian economy. They identify and apply a range of performance indicators to evaluate the performance of a large-scale organisation. A wide range of stakeholders exist for large-scale organisations. Students consider the organisation’s impact on stakeholder interests, possible conflicts that may arise between different stakeholder interests and related issues of ethical and social responsibility.

2. Internal environments of large-scale organisations
   Large-scale organisations, whether for-profit or not-for-profit, exist to achieve specific objectives. The success in achieving these objectives will be strongly influenced by the successful management of the internal business environment. Students investigate key elements of the internal environment such as different management structures, corporate culture, management roles and policy development. Students apply management styles and skills to business situations and then evaluate them. They discuss the implications of ethical and socially responsible management for the internal environment of large-scale organisations.

3. The operations management function
   Operations management combines the roles of management in order to transform inputs into outputs. The production of the product or service is the core objective of the large-scale organisation. The study of operations management enables students to consider the best and most responsible use of all the available resources for the production of a quality final good or service in a competitive, global environment.

Unit Outcomes
On completion of this unit the student should be able to:
- Discuss and analyse the context in which large-scale organisations operate
- Discuss and analyse major aspects of the internal environment of large-scale organisations
- Discuss and analyse strategies related to operations management
Unit Description
This unit continues the examination of corporate management. It commences with a focus on the human resource management function. Students learn about key aspects of this function and strategies used to most effectively manage human resources. This unit concludes with analysis of the management of change. Students learn about key change management processes and strategies and are provided with the opportunity to apply these to a contemporary issue of significance.

Areas of Study
1. The human resource management function
   In this area of study, students examine the practices and process of human resource management in large scale organisations in Australia. A general introduction to human resources is followed by an investigation of the two key aspects of human resource management: the employment cycle and employee relations. Students apply the principals of human resource management to a practical or simulated situation.

2. The management of change:
   In this area of study, students examine the importance of change management in large-scale organisations. They consider ways in which change can be managed effectively in both theoretical and practical contexts. Students evaluate various strategies to effectively manage change. This knowledge is then applied to one significant change issue for large-scale organisations. Teachers can select from a range of issues such as social responsibility, business ethics, globalisation, mergers and acquisitions, technological development, legislative compliance, privatisation or any other significant issue.

Unit Outcomes
On completion of this unit the student should be able to:
- Analyse and evaluate practices and processes related to human resource management
- Analyse and evaluate the management of change in a large-scale organisation, and evaluate the impact of change on the internal environment of a large-scale organisation
Unit 1
How can the diversity of materials be explained?

Unit Description
In this unit students investigate the chemical properties of a range of materials from metals and salts to polymers and nanomaterials. Using their knowledge of elements and atomic structure students explore and explain the relationships between properties, structure and bonding forces within and between particles that vary in size from the visible, through nanoparticles, to molecules and atoms.

Areas of Study
1. How can knowledge of elements explain the properties of matter?
   In this area of study students focus on the nature of chemical elements, their atomic structure and their place in the periodic table. In particular, they explore:
   - Elements and the periodic table
   - Structure and properties of metals
   - Structure and properties of ionic compounds
   - Quantifying atoms and compounds using the mole concept

2. How can the versatility of non-metals be explained?
   In this area of study students explore a wide range of substances and materials made from non-metals including molecular substances, covalent lattices, carbon nanomaterials, organic compounds and polymers. The following shall be investigated in detail:
   - The relationship between the bonding of a material and its properties
   - The structure and properties of carbon and graphite
   - Organic compounds
   - Polymers

3. Extended investigation
   In this area of study students apply and extend their knowledge and skills developed in Area of Study 1 and/or Area of Study 2 to investigate a selected question related to materials. They apply critical and creative thinking skills, science inquiry skills and communication skills to conduct and present the findings of an independent investigation into one aspect of the discoveries and research that have underpinned the development, use and modification of useful materials or chemicals. Students will choose a question to investigate and outline, analyse and evaluate relevant evidence to support their conclusions.

Unit Outcomes
On completion of this unit the student should be able to:
- Explain how evidence is used to develop or refine chemical ideas and knowledge
- Use models of structure and bonding to explain the properties and applications of materials
- Investigate a question related to the development, use and/or modification of a selected material or chemical and communicate a substantiated response to the question
Unit 2
What makes water such a unique chemical?

Unit Description
Water is the most widely used solvent on Earth. In this unit students explore the physical and chemical properties of water, the reactions that occur in water and various methods of water analysis. Students examine the polar nature of a water molecule and the intermolecular forces between water molecules. They explore the relationship between these bonding forces and the physical and chemical properties of water. In this context students investigate solubility, concentration, pH and reactions in water including precipitation, acid-base and redox. Students are introduced to stoichiometry and to analytical techniques and instrumental procedures, and apply these to determine concentrations of different species in water samples, including chemical contaminants. They use chemistry terminology including symbols, units, formulas and equations to represent and explain observations and data from experiments, and to discuss chemical phenomena. Students explore the solvent properties of water in a variety of contexts and analyse selected issues associated with substances dissolved in water.

Areas of Study
1. How do substances interact with water?
   In this area of study students focus on the properties of water and the reactions that take place in water including acid-base and redox reactions. In particular, the following areas will be studied:
   - Properties of water including melting and boiling points in relation to bonding
   - Specific heat capacity
   - Water as a solvent
   - Acid-base (proton transfer) reactions in water
   - Redox (electron transfer) reactions in water

2. How are substances in water measured and analysed?
   In this area of study students focus on the use of analytical techniques, both in the laboratory and in the field, to measure the solubility and concentrations of solutes in water, and to analyse water samples for various solutes including chemical contaminants. The topics discussed are:
   - Water sample analysis
   - Measurement of solubility and concentration
   - Analysis for salts in water
   - Analysis for organic compounds in water
   - Analysis for acids and bases in water

3. Practical Investigation
   The investigation requires the student to develop a question, plan a course of action that attempts to answer the question, undertake an investigation to collect the appropriate primary qualitative and/or quantitative data (which may including collecting water samples), organise and interpret the data and reach a conclusion in response to the question

Unit Outcomes
On completion of this unit the student should be able to:
- Relate the properties of water to its structure and bonding, and explain the importance of the properties and reactions of water in selected contexts
- Measure amounts of dissolved substances in water and analyse water samples for salts, organic compounds and acids and bases
- Design and undertake a quantitative laboratory investigation related to water quality, and draw conclusions based on evidence from collected data
Chemistry

Unit 3 2016

Unit Description
In this unit students investigate the scope of techniques available to the analytical chemist and gain an understanding of the chemical principles behind a variety of analytical techniques. Students also investigate organic reaction pathways and the chemistry of particular organic molecules. An awareness of the application of principles of green chemistry to chemical processes is an ongoing part of this course.

Areas of Study
1. Chemical Analysis
   - Volumetric analysis
   - Gravimetric analysis
   - Calculations including amount of solids, liquids and gases; concentration; volume, pressure and temperature of gases
   - Use of oxidation numbers to write redox equations
   - Principles and applications of chromatographic techniques and interpretation of qualitative and quantitative data from various methods of chromatography
   - Principles and applications of various spectroscopic techniques
   - Matching analytical techniques to a particular task

2. Organic Chemical Pathways
   - Structure and systematic nomenclature of some organic compounds
   - Common reactions of organic compounds
   - Organic reaction pathways
   - Structure of proteins
   - Biochemical fuels
   - The structure and bonding of DNA
   - Function of organic molecules in the design and synthesis of medicines

Unit Outcomes
On completion of this unit the student should be able to:
- Evaluate the suitability of techniques and instruments used in chemical analysis
- Identify and explain the role of functional groups in organic reactions and construct reaction pathways using organic molecules
Unit Description
In this unit students investigate the industrial production of chemicals and the energy changes associated with chemical reactions. The range of energy sources available to society, both renewable and non-renewable, is investigated from a chemical perspective. Students continue to learn about the applications of principles of green chemistry to chemical processes.

Areas of Study
1. Industrial Chemistry
   - rates of chemical reactions
   - energy profile diagrams
   - reversible reactions and chemical equilibria
   - pH as a measure of the strength of an acid or base
   - principles of waste management in the chemical industry
   - the industrial production of one chemical selected from ammonia, sulfuric acid and nitric acid.

2. Supplying and Using Energy
   - Comparison of the renewability of different energy sources including coal, natural gas, nuclear fuels and biochemical fuels
   - Applications of calorimetry to measure energy changes in chemical reactions
   - Use of the electrochemical series to predict the products of reactions
   - Simple galvanic, primary and secondary cells
   - Fuel cells including advantages and disadvantages
   - Simple electrolytic cells
   - Application of Faraday's laws in electrochemistry

Unit Outcomes
On completion of this unit the student should be able to:
- Analyse the factors that affect the extent and rate of chemical reactions and apply this analysis to evaluate the optimum conditions used in the industrial production of the selected chemical
- Analyse chemical and energy transformations occurring in chemical reactions
Chemistry

Unit 3 2017
How can chemical processes be designed to optimise efficiency?

Unit Description
The global demand for energy and materials is increasing with world population growth. In this unit students explore energy options and the chemical production of materials with reference to efficiencies, renewability and the minimisation of their impact on the environment.

Areas of Study
1. What are the options for energy production?
   In this area of study students focus on analysing and comparing a range of energy resources and technologies, including fossil fuels, biofuels, galvanic cells and fuel cells, with reference to the energy transformations and chemical reactions involved, energy efficiencies, environmental impacts and potential applications. In particular, we focus on:
   - Obtaining energy from fuels
   - Fuel choices
   - Galvanic cells as a source of energy
   - Fuel cells as a source of energy

2. How can the yield of a chemical product be optimised?
   In this area of study students explore the factors that increase the efficiency and percentage yield of a chemical manufacturing process while reducing the energy demand and associated costs. The different topics studied are:
   - Rate of chemical reactions
   - Extent of chemical reactions
   - Production of chemicals by electrolysis
   - Rechargeable batteries

3. Practical investigation
   The investigation requires the student to identify an aim, develop a question, formulate a hypothesis and plan a course of action to answer the question and that complies with safety and ethical requirements. The student then undertakes an experiment that involves the collection of primary qualitative and/or quantitative data, analyses and evaluates the data, identifies limitations of data and methods, links experimental results to science ideas, reaches a conclusion in response to the question and suggests further investigations which may be undertaken. Findings are communicated in a scientific poster

Unit Outcomes
On completion of this unit the student should be able to:
- 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 energy efficiency, renewability and environmental impact
- 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 design and undertake a practical investigation related to energy and/or food, and present methodologies, findings and conclusions in a scientific poster
Chemistry

Unit 4 2017
How are organic compounds categorised, analysed and used?

Unit Description
The carbon atom has unique characteristics that explain the diversity and number of organic compounds that not only constitute living tissues but are also found in the fuels, foods, medicines and many of the materials we use in everyday life. In this unit students investigate the structural features, bonding, typical reactions and uses of the major families of organic compounds including those found in food.

Areas of Study
1. How can the diversity of carbon compounds be explained and categorised?
   In this area of study students explore why such a vast range of carbon compounds is possible. They examine the structural features of members of several homologous series of compounds, including some of the simpler structural isomers, and learn how they are represented and named. The topics discussed are:
   - Structure and nomenclature of organic compounds
   - Categories, properties and reactions of organic compounds
   - Analysis of organic compounds

2. What is the chemistry of food?
   Food contains various organic compounds that are the source of both the energy and the raw materials that the human body needs for growth and repair. In this area of study students explore the importance of food from a chemical perspective. Students will explore:
   - Key food molecules
   - Metabolism of food in the human body
   - Energy content of food

Unit Outcomes
On completion of this unit a student should be able to:
- 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
- Distinguish between the chemical structures of key food molecules, analyse the chemical reactions involved in the metabolism of the major components of food including the role of enzymes, and calculate the energy content of food using calorimetry
Unit 1
Dramatic Storytelling

Unit Description
This unit focuses on creating, presenting and analysing a devised performance that includes real or imagined characters and is based on stimulus material that reflects personal, cultural and/or community experiences and stories. This unit also involves analysis of a student’s own performance work and of a performance by professional drama practitioners.

Areas of Study
1. Creating a devised performance
2. Presenting a devised performance
3. Analysing a devised performance
4. Analysing drama performances presented by other practitioners

Unit Outcomes
On completion of this unit the student should be able to:
- Devise and document solo and/or ensemble drama work/s based on experiences and/or stories
- Perform a devised drama work/s to an audience
- Analyse the development and performance to an audience of their non-naturalistic devised work
- Analyse the portrayal of stories and characters in a drama performance by professional or other drama practitioners
Unit 2
Non-naturalistic Australian Drama

Unit Description
This unit focuses on the use and documentation of the processes involved in constructing a devised solo or ensemble performance that uses non-naturalistic performance styles. Students create, present and analyse a performance based on a person, an event, an issue, a place, an artwork, a text and/or an icon from a contemporary or historical Australian context. Students use a range of stimulus material in creating the performance and examine non-naturalistic performance styles from a range of contexts relevant to Australia and Australians. Conventions appropriate to the selected performance styles are also explored. Students’ knowledge of how dramatic elements can be enhanced or manipulated through performance is further developed in this unit.

Areas of Study
1. Using Australia as inspiration
2. Presenting a devised performance
3. Analysing a devised performance
4. Analysing Australian drama performance

Outcomes
On completion of this unit the student should be able to:
• Devise and document the processes used to create a solo or ensemble non-naturalistic performance work
• Present a performance of a devised non-naturalistic work to an audience
• Analyse the creation, development and performance to an audience of their non-naturalistic devised work
• Analyse a performance of an Australian drama work
Unit 1

Unit Description
VCE English focuses on how English language is used to create meaning in written, spoken and multimodal texts of varying complexity. Literary texts selected for study are drawn from the past and present, from Australia and from other cultures. Other texts are selected for analysis and presentation of argument. The study is intended to meet the needs of students with a wide range of expectations and aspirations, including those for whom English is an additional language.

Areas of Study
1. Reading and creating texts
   - Students explore how meaning is created in a text.
   - Students identify, discuss and analyse decisions authors have made. They explore how authors use structures, conventions and language to represent characters, settings, events, explore themes, and build the world of the text for the reader.
   - Students investigate how the meaning of a text is affected by the contexts in which it is created and read.
   - Students consider the similarities and differences between texts, developing awareness that some features are specific to texts, while others are similar across texts.
   - They develop analytical responses dealing with the ways in which texts convey meaning and various points of view on key issues.
   - In developing creative responses to texts, students explore how purpose and audience affect the choices they make as writers.

2. Analysing and presenting argument:
   - Students focus on the analysis and construction of texts that attempt to influence an audience.
   - Students read a range of texts that attempt to position audiences in a variety of ways. They explore the use of language for persuasive effect and the structure and presentation of argument.
   - Students consider the contention of texts; the development of the argument including logic and reasoning, tone and bias; and the intended audience. Students consider how authors craft texts to support and extend the impact of an argument.
   - In considering the presentation of arguments in oral form, students also learn about the conventions of oral communication for persuasive purposes.
   - Students practise written analysis of the presentation of argument and the use of language to position the intended audience. They craft and present reasoned, structured and supported arguments and experiment with the use of language to position audiences.
   - In developing an argument or analysis, they draft, revise and edit to clarify and critique their thinking, and for technical accuracy, coherence, persuasive effect and quality of evidence.

Unit Outcomes
On completion of this unit the student should be able to:
- Produce analytical and creative responses to texts
- Analyse how argument and persuasive language can be used to position audiences, and create their own texts intended to position audiences
English/English as an Additional Language

Unit 2

Unit Description
In this unit students compare the presentation of ideas, issues and themes in texts. They analyse arguments presented and the use of persuasive language in texts and create their own texts intended to position audiences.

Areas of Study
1. Reading and comparing texts
   • Students explore how comparing texts can provide a deeper understanding of ideas, issues and themes. They investigate how the reader’s understanding of one text is broadened and deepened when considered in relation to another text.
   • Students explore how features of texts, including structures, conventions and language convey ideas, issues and themes that reflect and explore the world and human experiences, including historical and social contexts.
   • Students produce a written comparison of selected texts, discussing important similarities and differences, and exploring how the texts deal with similar or related ideas, issues or themes from different perspectives.
   • They develop an understanding of the choices available to writers and creators of texts, and the ways in which comparing texts can offer an enriched understanding of ideas, issues or themes.

2. Analysing and presenting argument
   • Students build on their understanding of argument and the use of persuasive language in texts that attempt to influence an audience
   • Students consider a range of texts where the primary purpose is to convince an audience to share a point of view. They develop an understanding of how texts are constructed for specific persuasive effects by identifying and discussing the impact of argument and persuasive language used to influence an audience
   • Students practise developing and presenting reasoned points of view on issues of contemporary social relevance. In constructing arguments students focus on the logical development of their own ideas, and select evidence and language to support their arguments

Unit Outcomes
On completion of this unit the student should be able to:
• Compare the presentation of ideas, issues and themes in two texts
• Identify and analyse how argument and persuasive language are used in text/s that attempt to influence an audience, and create a text which presents a point of view
Unit 3 2017

Unit Description
In this unit students read and respond to texts analytically and creatively. They analyse arguments and the use of persuasive language in texts.

Areas of Study
1. Reading and creating texts:
   - Students identify, discuss and analyse how the features of selected texts create meaning and how they influence interpretation
   - In identifying and analysing explicit and implied ideas and values in texts, students examine the ways in which readers are invited to respond to texts
   - Students prepare sustained analytical interpretations of selected texts, discussing how features of the texts create meaning and using textual evidence to support their responses
   - Students present sustained creative responses to selected texts, demonstrating their understanding of the world of the texts and how texts construct meaning

2. Analysing argument
   - Students analyse and compare the use of argument and language in texts that debate a topical issue. The texts must have appeared in the media since 1 September of the previous year
   - Students read and view media texts in a variety of forms, including print, non-print and multimodal, and develop their understanding of the way in which language and argument complement one another in positioning the reader
   - Consider information about the purpose, audience and context of a text, students explore the argument of a persuasive piece, and the way written, spoken and visual language is used and how this may strengthen or detract from the intended impact of a text
   - Students develop written and spoken critical analyses of the use of argument and language in written, spoken, and/or multimodal texts, including analysis of the quality of the reasoning presented and the use of features intended to position audiences
   - They compare different written texts presenting argument on similar ideas or issues, considering different ways authors use language to express arguments

Unit Outcomes
On completion of this unit the student should be able to:
- Produce an analytical interpretation of a selected text, and a creative response to a different selected text
- Analyse and compare the use of argument and persuasive language in texts that present a point of view on an issue currently debated in the media
English/English as an Additional Language

Unit 3 2017

Area of Study 3 – EAL students ONLY

1. Listening to texts
   - Students develop and refine their listening skills. They listen to a range of spoken texts and use active listening strategies to understand information, ideas and opinions presented in texts
   - Students develop skills to understand spoken texts on a literal and inferential level, demonstrating an understanding of how spoken texts construct meaning for a variety of listeners. This understanding includes the relationship between the speaker/s and their audience, the purpose of the spoken text and the speaker’s views and attitudes and how these affect the structure and language of the spoken text (conversations, narratives, speeches, interviews, lectures, radio)
   - Students demonstrate their understanding through a range of spoken, written and visual forms, including class

Unit Outcome
- On completion of this unit the student should be able to comprehend a spoken text
English/English as an Additional Language

Unit 4 2017

Unit Description
In this unit 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.

Areas of Study
1. Reading and comparing texts
   - Students explore the meaningful connections between two texts. They analyse texts, including the interplay between character and setting, voice and structure, and how ideas, issues and themes are conveyed.
   - By comparing the texts, they gain a deeper understanding of the ideas, issues and themes that reflect the world and human experiences.
   - Students produce a written analysis comparing selected texts, discussing important similarities and differences.
   - They explore how the texts deal with similar or related ideas, issues or themes from different perspectives to reflect particular values.

2. Presenting argument
   - Students build their understanding of both the analysis and construction of texts that attempt to influence audiences.
   - They use their knowledge of argument and persuasive language as a basis for the development of their own persuasive texts in relation to a topical issue that has appeared in the media since 1 September of the previous year.
   - This area of study focuses on the construction of persuasive texts. Students use their understanding of argument and language as the basis for the development of an oral presentation of their points of view.
   - Students draw on their knowledge to express their viewpoints through arguments and persuasive language selected specifically to position an audience.
   - Students use discussion and writing to clarify their thinking and develop a viewpoint on an issue, to plan and prepare an argument and its supporting evidence, and to develop and prepare any materials to support an oral presentation. Students identify approaches to positioning the audience that are appropriate to the issue.
   - Students reflect on their intentions in positioning the reader and consider how their use of language expresses their argument. They explore options for language use for audience engagement and persuasive effect.

Unit Outcomes
On completion of this unit the student should be able to:
- Produce a detailed comparison which analyses how two selected texts present ideas, issues and themes.
- Construct a sustained and reasoned point of view on an issue currently debated in the media.
Unit Description
In this unit students study safe and hygienic food handling and storage practices to prevent food spoilage and food poisoning, and apply these practices in the preparation of food. Students consider the selection and use of a range of tools and equipment suitable for use in food preparation. Students examine the links between classification of foods and their properties, and examine changes in properties of food when different preparation and processing techniques are used. They investigate quality and ethical considerations in food selection. Students use the design process to meet the requirements of design briefs to maximise the qualities of key foods.

Areas of Study
1. Keeping food safe
   • Principles of food hygiene and safe food handling in a small-scale food operation
   • Causes of food spoilage and food poisoning
   • Storage practices to ensure safety and maximise the quality of food
   • Safe and hygienic use of tools and equipment to produce quality outcomes

2. Food Properties and preparation
   • The design process and its role in planning, and safely and hygienically preparing and processing foods in a way that maximises the qualities of key foods
   • Plant or animal origin, structure, and classification of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs
   • Considerations in food selection, including food quality and ethical issues such as fair trade and intensive farming practices
   • Physical, sensory and chemical properties of selected key foods
   • Functional properties of selected key foods and their role in food preparation and processing
   • Changes in physical and sensory properties of selected key foods during preparation and processing

Unit Outcomes
On completion of this unit students should be able to:
• Explain and apply safe and hygienic work practices when storing, preparing and processing food
• Analyse the physical, sensory, chemical and functional properties of key foods, and select, prepare and process foods safely and hygienically to optimise these properties using the design process
Food and Technology

Unit 2
Planning and Preparation of Food

Unit Description
In this unit students investigate the most appropriate tools and equipment to produce optimum results, including the latest developments in food technology. Students research, analyse and apply the most suitable food preparation, processing and cooking techniques to optimise the physical, sensory and chemical properties of food. Students work both independently and as members of a team to research and implement solutions to a design brief. They use the design process to respond to challenges of preparing food safely and hygienically for a range of contexts and consumers, taking into account nutritional considerations, social and cultural influences, and resource access and availability. Students also explore environmental considerations when planning and preparing meals.

Areas of Study
1. Tools, equipment, preparation and processing
   - Appropriate selection and safe and hygienic use of tools and equipment for food preparation and processing
   - Technological developments in tools and equipment for domestic use
   - Properties of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs
   - Suitability of food preparation and processing, wet and dry cooking techniques and presentation methods that optimise properties of key foods, including nutrient content, appearance, aroma, flavour and texture

2. Planning and preparing meals
   - The design process and its role in planning and evaluating meals in small-scale food operations
   - Safe and hygienic food preparation and processing in meal preparation
   - Nutritional considerations when planning, including basic nutritional requirements and special nutritional requirements, such as reduced fat, high fibre, food allergies and food intolerances
   - Social and cultural influences that have an impact on meal planning, such as:
     - lifestyle of consumers at a specific stage of the life span, for example childhood and adolescence
     - purpose of the meal
     - beliefs and customs
     - use of Australian indigenous ingredients
     - vegetarianism
   - The impact of resources on planning, such as access to ingredients, skills, equipment, time, and budget
   - Environmental considerations in planning to minimise waste and effectively use resources such as consideration of food miles and use of seasonally available ingredients
   - Food preparation techniques and ingredients suitable for specific purposes, including retaining and improving nutritional value of food
   - Methods of evaluating planning and production activities

Unit Outcomes
On completion of this unit the student should be able to:
- To use a range of tools and equipment to demonstrate skills and implement processes in the preparation, processing, cooking and presentation of key foods to maximise their properties
- Individually and as a member of a team, use the design process to plan, safely and hygienically prepare and evaluate meals for a range of contexts
Unit Description
In this unit students develop an understanding of food safety in Australia and the relevant authorities and their regulations. They investigate the causes of food spoilage and food poisoning and apply safe work practices while preparing food. Students demonstrate understanding of key foods and analyse the functions of the natural components of key foods. They investigate cooking techniques and justify the use of the techniques they select when preparing key foods. Students develop an understanding of the primary and secondary processes that are applied to key foods, including food processing techniques to prevent spoilage. They also preserve food using these techniques. Students devise a design brief from which they develop a detailed design plan to complete a set of food items. They implement the design plan in Unit 4.

Areas of Study
1. Maintaining food safety in Australia
   - Causes of food spoilage and food poisoning
   - Safety and hygiene practices to prevent food spoilage and food poisoning
   - The roles and responsibilities of national, state and local authorities in ensuring a safe food supply
   - Food Standards Code in Australia including food labelling regulations, nutrition content claims and health claims
   - Purpose of the HACCP system, and the role of each of the steps in ensuring food safety

2. Food preparation and processing
   - The primary and secondary processing of key foods
   - The physical, sensory and chemical properties of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs
   - Functions of natural food components of key foods, including acids, enzymes, alkalis, proteins, starches and sugars, fats and oils and their impact on food preparation and processing
   - Techniques of cooking key foods, including dry methods, wet methods and microwave cooking
   - Preservation techniques to prevent spoilage of food, including freezing, dehydration, use of sugars, use of acids and heat processing (bottling)

3. Developing a design plan
   - The components of a design brief, including context and specifications
   - Development of criteria for evaluation that relate to the design brief
   - The role and importance of components of a design plan
   - Exploration of ideas and research that leads to an outline of a proposed set of food items as a response to a design brief
   - Properties of ingredients to be used in the preparation of the proposed food items
   - Food preparation and techniques of cooking, and preservation techniques suitable to produce a high-quality product that meets the specifications in the design brief
   - Tools and equipment suitable for preparing and processing the proposed food items
   - Food safety and hygiene requirements necessary to produce the proposed food items
   - Methods of developing an overall timeline for production of the four to six food items

Unit Outcomes
On completion of this unit the student should be able to:
- Explain the roles and responsibilities of and the relationship between national, state and local authorities in ensuring and maintaining food safety within Australia. Analyse preparation, processing and preservation techniques for key foods, and prepare foods safely and hygienically using these techniques
- Develop a design brief, evaluation criteria and a design plan for the development of a food product
Food and Technology

Unit 4
Food Product Development and Emerging Trends

Unit Description
In this unit students 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. They use appropriate tools and equipment and evaluate their planning, processes and product. Students examine food product development, and research and analyse driving forces that have contributed to product development. They investigate issues underpinning the emerging trends in product development. Students also investigate food packaging, packaging systems and marketing.

Areas of Study

1. Implementing a design plan
   - Planning processes to implement a design plan
   - Properties of foods (including physical, sensory, chemical and functional properties)
   - Complex processes, food preparation, processing, preservation and presentation techniques to implement the design plan
   - Food safety and hygiene practices to implement production plans
   - Methods of recording evidence of the food products
   - Methods of evaluating food products, processes and production activities

2. Food product development
   - Sustainable farming practices as driving forces in food production and the reasons for managing the use of water and chemicals, prevention of land degradation and adoption of organic farming methods
   - Driving forces related to the development of food products, including social pressures, consumer demands, technological developments and environmental considerations
   - The process of food product development, and quantitative and qualitative analysis of new food products
   - Types of food product development, including me-toos and line extensions
   - New and emerging foods, including functional foods and foods to meet particular dietary requirements and food intolerances
   - Innovations and emerging technologies in food product development, including genetic modification, high pressure processing, microencapsulation and membrane technology
   - The purposes of packaging and packaging systems, including Aseptic packaging and Modified Atmosphere Packaging (MAP)
   - Environmental issues associated with food manufacturing and food packaging
   - Food product marketing and promotional strategies, including ethical food marketing to children

Unit Outcomes
On completion of this unit the student should be able to:

- Safely and hygienically implement the production plans for a set of four to six food items that comprise the product, evaluate the sensory properties of the food items, evaluate the product using the evaluation criteria, and evaluate the efficiency and effectiveness of production activities
- Analyse driving forces related to food product development, analyse new and emerging food products, and explain processes involved in the development and marketing of food products
Unit Description
Hazards represent the potential to cause harm to people and/or the environment, whereas disasters are judgments about the impacts of hazard events. Hazards include a wide range of situations including those within local areas, such as fast moving traffic or the likelihood of coastal erosion, and regional and global hazards, such as drought and infectious disease.

In this unit, students examine the processes involved with hazards and hazard events, including their causes and impacts, as well as the interconnections between human activities and natural phenomena. Further, students investigate how people have responded to specific types of hazards, including attempts to reduce vulnerability to, and the impact of, hazard events.

Areas of Study
1. Characteristics of Hazards
   In this area of study, students examine hazards and hazard events before engaging in a study of at least two specific hazards at a range of scales. They study one from at least two different types of hazards (geological, hydro-meteorological, biological and technological), for example, coastal hazards and an alien animal invasion, or floods and oil spills. The selection of hazards will allow students to use visual representations and topographical maps at various scales and undertake fieldwork.

2. Response to Hazards and Disasters
   In this area of study, students investigate the human responses to the hazards selected in Area of Study 1. They explore the nature and effectiveness of specific measures, such as prediction and warning programs, community preparedness and land use planning, as well as actions taken after hazards become harmful and destructive disasters. Further, students study natural and human factors influencing the nature of human responses, considering the scale of the hazard, levels of risk due to hazards, past experiences and perceptions of similar hazards and hazard events. They also consider the economic choices available to government organisations and communities to take action, available technological resources, as well as the ability to plan and develop effective prevention and mitigation measures.

Unit Outcomes
On completion of this unit, students should be able to:

- Analyse, describe and explain the nature of hazards and impacts of hazard events at a range of scales (Area of Study 1); and
- Analyse and explain the nature, purpose and effectiveness of a range of responses to selected hazards and disasters (Area of Study 2)
Unit Description
Over one billion tourists a year cross international boundaries with greater numbers involved as domestic tourists within their own countries. The scale of tourist movements since the 1950s and its predicated growth has had, and continues to have, a significant impact on local, regional and national environments, economies and cultures.

In this unit, students investigate the characteristics of tourism, with particular emphasis on where it has developed, its various forms, how it has changed and continues to change and its impacts on people, places and environments.

Areas of Study
1. Characteristics of Tourism
   In this area of study, students examine the characteristics, location and distribution of different types of tourism and tourist destinations, as well as the factors affecting tourism. They investigate in detail at least one tourism location within Australia using appropriate fieldwork techniques, and one other location elsewhere in the world. The selection of examples will allow students to work with a range of information sources, for example statistical data, digital images, streamed video and a variety of maps at various scales.

2. Impact of Tourism
   In this area of study, students explore the environmental, economic and socio-cultural impacts of different types of tourism. They evaluate the effectiveness of measures taken to enhance the positive impacts and/or to minimise the negative impacts at the chosen locations (as per Area of Study 1). Further, students investigate the interconnection of the two selected locations with their surrounding region and national context.

Unit Outcomes
On completion of this unit the student should be able to:
- Analyse, describe and explain the nature of tourism at a range of scales (Area of Study 1); and
- Analyse and explain the impacts of tourism on people, places and environments and evaluate the effectiveness of strategies for managing tourism (Area of Study 2)
Geography

Unit 3
Changing the Land

Unit Description
Natural land cover has been altered by many processes such as geomorphological events, plant succession and climate change. Further, people have modified land cover to produce a range of land uses to satisfy their needs such as housing, resource provision, communication, recreation and so on.

This unit focuses on two investigations of geographical change: change to land use and change to land cover.

Areas of Study
1. Land Use Change
   In this area of study, students select a local area and use appropriate fieldwork techniques and secondary sources to investigate the processes and impacts of land use change. This change may have recently occurred, is underway or is planned for the near future.

2. Land Cover Change
   In this area of study, students undertake an overview of global land cover and changes that have occurred over time. They investigate three major processes that are changing land cover: deforestation, desertification and melting glaciers and ice sheets. Further, students analyse these processes, explain their impacts on land cover and discuss responses to these land cover changes at three different locations in the world – one location for each process. They also evaluate three different global responses to the impacts of land cover change, one global response for each process.

Unit Outcomes
On completion of this unit the student should be able to:

- Analyse, describe and explain land use change and assess its impacts (Area of Study 1); and
- Analyse, describe and explain processes that result in changes to land cover and discuss the impacts and responses resulting from these changes (Area of Study 2).
Unit Description
The growth of the world’s population from 2.5 billion in 1950 to over 7 billion since 2010 has been on a scale without parallel in human history. Much of the current growth is occurring within developing countries while the populations in many developed countries are either growing slowly or are declining.

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. Further, students investigate two significant population trends arising in different parts of the world and examine the dynamics of populations and their economic, social, political and environmental impacts on people and places.

Areas of Study
1. Population Dynamics
   In this area of study, students undertake an overview of world population distribution and growth before investigating the dynamics of population change over time and space. Through the study of population dynamics, they investigate growth and decline in fertility and mortality, together with population movements. Students study forced and voluntary, and internal and external, population movements and how they can be long term or short term. The study is supported with examples from within and between countries with different economic and political conditions and social structures that illustrate the dynamics of population. Students develop understanding of the Population Transition Model and its applications, and the Malthusian theory of population.

2. Population Issues and Challenges
   In this area of study, students undertake investigations of two significant population trends that have developed in different parts of the world: a growing population of one country and an ageing population of another country. They investigate issues arising from each population trend (such as healthcare and social services), the challenges that arise in coping with the issues, and their interconnection with population dynamics. Further, students evaluate the effectiveness of strategies in response to these issues and challenges - strategies can be selected from government and/or non-government organisations.

Unit Outcomes
On completion of this unit the student should be able to:
- Analyse, describe and explain population dynamics on a global scale (Area of Study 1); and
- Analyse, describe and explain the nature of significant population issues and challenges in selected locations and evaluate responses (Area of Study 2)
Health and Human Development

Unit 1
The Health and Development of Australia’s Youth

Unit Description
This unit focuses on the health and development of Australia’s youth as well as the many factors that influence their health and development. Students investigate one health issue in detail and analyse personal, community and government strategies or programs that affect youth health and development.

Areas of Study
1. Understanding youth health and development;
   - Definitions of physical, social, emotional and intellectual development
   - Characteristics of, and interrelationships between, physical, social, emotional and intellectual development during the lifespan stage of youth
   - Definitions of health and the limitations of these definitions
   - Characteristics of, and interrelationships between, physical, social and mental dimensions of health
   - Measurements of health status
   - The health status of Australia’s youth
   - Biological determinants of health and development of Australia’s youth
   - The interrelationships between health and development during the lifespan stage of youth

2. Youth issues;
   - The function of major nutrients for the development of hard tissue, soft tissue, blood tissue and energy
   - The consequence of nutritional imbalance in a youth’s diet on short and long-term health and development
   - Food selection models as tools to promote healthy eating during youth
   - Determinants of the health and development of Australia’s youth, including behavioural, physical environment and social environment
   - Health issues facing Australia’s youth
   - The key features of one health issue for Australia’s youth, including:
     ~ Its impact on all dimensions of health and development
     ~ Its incidence, prevalence and changes over time (trends)
     ~ Determinants of health that act as risk and/or protective factors
     ~ Government, community and personal strategies or programs designed to promote health and development of youth
     ~ The range of health care services available to youth and their rights and responsibilities in accessing and using relevant services (including Medicare)

Unit Outcomes
On completion of this unit the student should be able to:
- Describe the dimensions of, and interrelationships within and between youth health and development, and analyse the health status of Australia’s youth using appropriate measurements
- Describe the factors that have an impact on the health and development of Australia’s youth
- Outline health issues relevant to Australia’s youth, and in relation to a specific health issue, analyse strategies or programs that have an impact on youth health and development
Health and Human Development

Unit 2
Individual Human Development and Health Issues

Unit Description
This unit focuses on the health and development for the lifespan stages of prenatal, childhood and adulthood. In this unit students identify issues that affect the health and development of Australia’s mothers and babies, children and adults. Students investigate health issues in detail and analyse personal, community and government strategies and programs relevant to these stages of the lifespan.

Areas of Study
1. Prenatal health and individual development
   - The process of fertilisation
   - Physical development from conception to birth
   - The health status of Australia’s pregnant women and unborn babies
   - Determinants that have an impact on health and development during the prenatal stage of the lifespan, including biological, behavioural, physical environment and social environment
   - Determinants that act as risk and/or protective factors in relation to one health issue such as spina bifida, low birth weight, foetal alcohol syndrome or gestational diabetes
   - Government, community and personal strategies and programs designed to promote health and development of pregnant women and unborn children

2. Child health and individual development
   - Physical, social, emotional and intellectual development from birth to late childhood
   - The principles of individual human development
   - The health status of Australia’s children
   - Determinants of the health and development of Australia’s children, including biological, behavioural, physical environment and social environment
   - Determinants that act as risk and/or protective factors in relation to one health issue such as asthma, falls and injuries, food allergies, juvenile arthritis or Type 1 diabetes
   - Government, community and personal strategies and programs designed to promote the health and development of children

3. Adult health and individual development
   - The different classifications of the stages of adulthood
   - Characteristics of physical development during adulthood
   - The social, emotional and intellectual development associated with the stages of adulthood and ageing
   - The health status of Australia’s adults
   - Determinants of health and development of Australia’s adults, including biological, behavioural, physical environment and social environment
   - Determinants that act as risk and/or protective factors in relation to one health issue such as cardiovascular disease, cancer, Type 2 diabetes, obesity or mental illness
   - Government, community and personal strategies and programs designed to promote health and individual human development of adults

Unit Outcomes
On completion of this unit the student should be able to:
- Describe and explain the factors that affect health and development during the prenatal stage of the lifespan
- Describe and explain the factors that affect the health and development of Australia’s children
- Describe and explain the factors that affect the health and development of Australia’s adults
Unit Description
Australians generally enjoy good health when compared to other developed countries however, there is still potential for improvements. In this unit, students have the opportunity to investigate the National Health Priority Areas (NHPAs) initiative, the diversity of health outcomes within our population and the factors that contribute to health status. Students also look at the Australian health system and the role government and non-government organisations play in the implementation of a range of initiatives designed to promote health in Australia.

Areas of Study
1. Understanding Australia’s health
   - Definitions of physical, social and mental dimensions of health and health status
   - Different measures of health status of Australians
   - Health status of Australians compared with populations in other developed countries;
   - Variations in the health status of population groups in Australia, including males and females, higher and lower socioeconomic status groups, rural and remote populations and Indigenous populations;
   - The role of determinants of health, including the physical environment, biological, behavioural and social, in explaining variations in health status
   - The National Health Priority Areas (NHPAs) including;
     ~ key features and reasons for selection of each NHPA
     ~ determinants that act as risk factors
     ~ direct, indirect and intangible costs to individuals and communities of NHPAs
     ~ one health promotion program relevant to each NHPA
   - The role of nutrition in addressing the following conditions recognised in the NHPAs: cardiovascular disease, diabetes mellitus, colorectal cancer, obesity and osteoporosis, taking into account, where relevant, the function (as a determinant of health) and major food sources of protein, carbohydrate, fats, water, calcium, phosphorus, sodium and vitamin D

2. Promoting health in Australia
   - Models of health and health promotion including the biomedical model of health, social model of health and the Ottawa Charter for Health Promotion;
   - The role of VicHealth including;
     ~ the mission and strategic priorities of VicHealth
     ~ potential health outcomes of a VicHealth funded project and how it reflects the social model of health
   - Australia’s health system including;
     ~ local, state and federal governments’ responsibilities for health and health funding
     ~ the values that underpin the Australian health system
     ~ Medicare, Pharmaceutical Benefits Scheme (PBS) and private health insurance
   - The role of Australia’s governments in promoting healthy eating through
     ~ the information provided by nutrition surveys and how it is used
     ~ the Australian Guide to Healthy Eating and Dietary Guidelines for Australian Adults
   - The role of Australia’s non-government agencies, including Nutrition Australia, in providing dietary advice to promote healthy eating

Unit Outcomes
On completion of this unit the student should be able to:
   - Compare the health status of Australia’s population with other developed countries and compare and explain the variations in health status of population groups within Australia
   - Discuss the role of the National Health Priority Areas in improving Australia’s health status
   - Discuss and analyse approaches to health and health promotion, and describe Australia’s health system and the different roles of government and non-government organisations in promoting health
Unit Description
This unit takes a global perspective on achieving sustainable improvements in health and human development. In the context of this unit, human development is about creating an environment in which people can develop to their full potential and lead productive, creative lives in accord with their needs and interests. Students focus on the work of the United Nations, World Health Organisation, Department of Foreign Affairs and Trade and non-government organisations and their initiatives aimed at reducing global burden of disease.

Areas of Study
1. Introducing global health and human development
   - Characteristics of developed and developing countries, including high/large mortality strata
   - Definitions of sustainability (including elements of appropriateness, affordability, equity) and human development (including the human development index) according to the UN
   - Similarities and differences in health status and human development between developing countries and Australia
   - The influence on the health status of developing countries compared to Australia of income, gender equality, peace/political stability, education, access to healthcare, global marketing (of alcohol, tobacco and fast/processed foods) and physical environments
   - The UNEight Millennium Development Goals, their purpose and reasons why they are important

2. Promoting global health and human development
   - The interrelationships between health, human development and sustainability to produce sustainable human development in a global context
   - Different types of aid, including emergency aid, bilateral and multilateral, non-government organisation aid, and how they are used to achieve global health and sustainable human development
   - The role of the UN in providing global health and sustainable development through the following areas of action: world peace and security, human rights, humanitarian assistance and social and economic development
   - The agenda of the WHO in promoting global health and sustainable human development
   - The responsibilities of the Australian Government's AusAID initiatives and the role it plays in developing programs to improve global health and sustainable development
   - The role of non-government organisations based in Australia in promoting global health and sustainable human development
   - Programs focusing on literacy, food security, HIV/AIDS and malaria, immunisation, safe water and sanitation in terms of:
     ~ reasons for each program
     ~ types of aid involved in the programs
     ~ implementation of the programs
     ~ their contribution to the achievement of sustainable human development

Unit Outcomes
On completion of this unit the student should be able to:
- Analyse factors contributing to variations in health status between Australia and developing countries and evaluate progress towards the United Nations' Millennium Development Goals
- Describe and evaluate programs implemented by government and non-government organisations and analyse the interrelationships between health, human development and sustainability
Unit Description
Unit 1 explores the nature of political, social and cultural change in the period between the world wars. This unit focuses on the changes to the world order at the end of WWI and how these changes affected developments in Europe, the USA, Asia, Africa and the Middle East. The course examines the significant social and cultural changes in the 1920s and 1930s characterised by the emergence of fascist governments, the persecution of minority groups and increased militarism.

Areas of Study
1. Ideology and Conflict
2. Social and Cultural Change

Unit Outcomes
On completion of this unit the student should be able to:

- Understand the consequences of the peace treaties which ended World War One and the impact of ideologies on nations and the events that led to World War Two
- Explain patterns of social life and cultural change in one or more contexts and analysis of the factors which influenced changes to social life and culture in the inter-war years
History

Unit 2
Twentieth Century History 1945 to 2000

Unit Description
This unit explores the nature and impact of the Cold War and challenges and changes to existing political, economic and social structures in the second half of the twentieth century. The unit examines the internationalist approach to avoiding warfare, resolving political tensions and addressing threats to human life and safety. It studies the competing ideologies of democracy and communism, setting the backdrop for the Cold War.

Areas of Study
1. Competing Ideologies
2. Challenge and Change

Unit Outcomes
On completion of this unit the student should be able to:
• Explain the ideological divisions in the post-war period and analysis of the nature, development and impact of the Cold War on nations and people in relation to one or more specific conflicts in the period
• Explain the causes and nature of challenge and change in relation to two selected contexts and analysis of the consequences for nations and individuals
History

Units 3 and 4
Revolutions – Russia and France

Unit Description
Students investigate the historical causes and consequences of political revolution. Revolution is a dramatically accelerated process of change whereby the new order seeks to create political and social transformation based on a new ideology. Progress in a post-revolutionary society is not guaranteed or inevitable. Challenges to the new order may result in extreme measures of violence, oppression and terror.

In this course students develop an understanding of the complexity and multiplicity of causes and consequences in the revolutionary narrative. They construct historical arguments based on primary sources and evaluate the extent to which revolution has bought change to people’s lives. They consider the ways continuity and change play out in those societies.

Areas of study
1. Causes of Revolution
2. Consequences of Revolution

Unit Outcomes
On completion of this unit the student should be able to:
• Analyse the causes of revolution, and evaluate the contribution of significant ideas, events, individuals and popular movements
• Analyse the consequences of revolution and evaluate the extent of change brought to society
Unit Description
Revolutions are great disjunctures of time and mark deliberate attempts at new directions. They share the common aim of breaking with the past and by destroying regimes and societies, embarking on a program of political and social transformation. The country studied is France.

Areas of Study
1. Revolutionary ideas, leaders, movements and events
   France: 1781 to 4 August 1789
   The causes of revolution are examined. Students evaluate the role of ideas, leaders, movements and events in the development of a revolutionary situation. This includes knowledge of the key events of the era, the causes of tensions and conflicts, the ideas used in the revolutionary struggle and the role of individuals and groups.

2. Create a new society
   France: 5 August 1789 to Year III, (1795)
   A new political order is not created easily. Revolutions take many years to achieve social and political change. There are ongoing debates about the extent to which significant change was achieved and whether the subjects of the new order had an improved standard of living. Students should be able to assess the contribution of individuals/groups to the progression of the revolution, examine the key ideas and analyse the challenges faced by those changing the society.

The gathering and evaluation of evidence and historians' interpretations is integral to this study.

Unit Outcomes
On completion of these units, students should be able to:
- Evaluate the role of ideas, leaders, movements and events in the development of the revolution
- Analyse the challenges facing the emerging order and the way in which attempts were made to create a new society, and evaluate the nature of the society created by the revolution.
Information Technology: Computing

Unit 1

Unit Description
In this unit students focus on how data, information and networked digital systems can be used to meet a range of users’ current and future needs. In Area of Study 1 students collect primary data when investigating an issue, practice or event and create a digital solution that graphically presents the findings of the investigation. In Area of Study 2 students examine the technical underpinnings of wireless and mobile networks, and security controls to protect stored and transmitted data, to design a network solution that meets an identified need or opportunity. They predict the impact on users if the network solution were implemented. In Area of Study 3 students acquire and apply their knowledge of information architecture and user interfaces, together with web authoring skills, when creating a website to present different viewpoints on a contemporary issue.

Students study the following software tools; software to create graphic solutions, web authoring tools and project management tools.

Areas of Study
1. Data and graphic solutions
   In this area of study students conduct an investigation into an issue, practice or event and through the systematic collection, interpretation and manipulation of primary data they create a graphic solution, such as an infographic, that represents their findings. Graphic solutions could include charts, flowcharts, diagrams, images, hierarchies, animations, maps and timelines.

   Students develop and apply a detailed understanding of data, including its types, characteristics, sources and methods of acquisition. Relevant primary data is collected and then evaluated to determine its suitability for manipulation. When acquiring this data, students consider risks associated with using data owned by other people or organisations, and apply strategies and techniques for acknowledging legal requirements and ethical responsibilities. Students apply computational thinking skills when extracting meaning from data and apply design thinking knowledge and skills to create graphic information for the purpose of informing, educating or persuading an audience.

2. Networks
   In this area of study students investigate how networks with wireless capability allow data and information to be exchanged locally and within the global environment. Students examine the hardware and software components and procedures required to connect and maintain a wireless network. Students apply this technical knowledge to create the design for a network with wireless capability that meets a need or opportunity, identifying its components and how data and information are transmitted. Students use a software tool to depict the components of their network and its interactions.

3. Collaboration and communication
   In this area of study students examine how the use of particular information systems within specified contexts can cause tensions and conflicts between different stakeholders. Students develop the ability to critically appraise how information systems are used and how individuals can be empowered to shape their use.

Working in virtual or face-to-face teams, students use web authoring software to create a website, designed for viewing on a mobile device, which presents an overview of an issue associated with one field. When designing their website students apply their knowledge of information architecture such as structuring sets of information to facilitate navigation and allowing users choices about levels of detail. They evaluate the merits of storing their website and its content in the cloud or on a private server.
Unit Description
In this unit students focus on data and how the application of computational, design and systems thinking skills support the creation of solutions that automate the processing of data. In Area of Study 1 students develop their computational thinking skills when using a programming or scripting language to create solutions. They engage in the design and development stages of the problem-solving methodology. In Area of Study 2 students develop a sound understanding of data and how a range of software tools can be used to extract data from large repositories and manipulate it to create visualisations that are clear, usable and attractive, and reduce the complexity of data. In Area of Study 3 students apply all stages of the problem-solving methodology to create a solution using database management software and explain how they are personally affected by their interactions with a database system.

Students study the following software tools; programming/scripting language, database software and visual thinking tools.

Areas of Study
1. Programming
Students focus on using a programming or scripting language that can support object-oriented programming to create working software modules. These languages provide users with greater flexibility than application software, as specific sets of instructions can be implemented to create solutions that are purpose designed.

Students develop skills in interpreting teacher-provided solution requirements and in designing working modules. They apply knowledge and skills associated with the design and development stages of the problem-solving methodology. Students also apply computational and design thinking skills when preparing design specifications and transforming them into working modules through the use of programming or scripting languages.

2. Data analysis and visualisation
Students learn to use software tools to access, select and, where appropriate, manipulate authentic data from large data repositories, and to present the key aspects of the data in an appropriate visual form. Once the data has been isolated and checked for its integrity, students create data visualisations that assist in reducing the complexity of data by using designs that illustrate patterns, connections and structure. These visualisations should minimise the effort required by readers to interpret complex data and they need to be clear, usable and relevant. Some data visualisation tools allow presentations to be dynamic and/or interactive. Appropriate visualisation forms include graphs, charts, spatial relationships, maps, histograms and network diagrams (nodes and edges).

3. Data management
Students are introduced to the structure of databases and their applicability in a range of settings. They apply systems thinking skills when considering the effects of their interactions with information systems that use databases.

Unit Outcomes
On completion of Units 1&2 the student should be able to:
• Use ICT tools and techniques, produce a solution in response to an identified need
• Create visual presentations such as multimedia presentations
• Deliver oral presentations supported by a visual presentation
• Develop an electronic learning journal, such as a blog, to record learning progress
• Complete written reports using ICT
Unit Description
The focus of Unit 3 is the World Wide Web and how it supports the information needs of individuals, communities and organisations. In Area of Study 1, students investigate the design and technical underpinnings of different types of websites that support the varying needs of online communities.

Students use web authoring software to create prototype websites for particular online communities, taking into account both technical and non-technical constraints.

Area of Study 2 focuses on the use of a relational database management system (RDBMS). Students examine techniques used by organisations to acquire data via websites and consider the relationship between how the data is acquired and the structure of an RDBMS. At the practical level, students acquire and apply knowledge and skills in the use of an RDBMS. In Unit 4 when solving information problems students can either use spreadsheet software or continue to use an RDBMS.

Students apply the analysis, design and development stages of the problem-solving methodology when creating solutions.

Areas of Study
1. Organisations and data management
   In this area of study students develop knowledge about how organisations acquire data via websites. They also develop knowledge and skills in using a relational database management system (RDBMS) to manipulate data typically acquired through websites.

   Students review websites to ascertain the types of data being acquired, including text, numeric and images (still and moving), and to identify how the data is acquired. Students examine how organisations fulfil their legal requirements of protecting the rights of data providers and why organisations want the data organised in particular ways. This provides a lead-in to the fundamentals of an RDBMS, namely fields and field types, and the relationships between data sets.

   Students develop knowledge and skills in describing data types and data structures, and in applying functions, techniques, formats and conventions to manipulate and validate data, and to present suitable information.

2. Online communities
   In this area of study students investigate types of online communities and their needs, and the types, purposes and functionality of specific types of websites that support information exchange, including wikis, blogs, forums and social networking sites.
Unit Description
In this unit students focus on how ICT is used by organisations to solve ongoing information problems and on the strategies used to protect the integrity and security of data and information. In Area of Study 1 either a relational database management system (RDBMS) or spreadsheet software is selected and used to create solutions to information problems. In addition, students use web authoring or multimedia authoring software to produce onscreen user documentation. When creating solutions to ongoing information problems, students apply all stages of the problem-solving methodology.

In Area of Study 2, students explore how organisations manage the storage, communication and disposal of data and information in order to minimise threats to the integrity and security of data and information, and to optimise efficient information handling.

Areas of Study
1. Organisations and information needs
   In this area of study students develop and apply knowledge and skills for solving ongoing information problems encountered in organisations. This involves developing knowledge about decision making in organisations and how information systems enable information to be produced to assist decision making. An RDBMS or spreadsheet software is selected for use. Through the application of all of the stages of the problem-solving methodology and the selected software, students create solutions to solve problems. Solutions of this nature have the capacity to process new sets of data for recurring problems. To support the ongoing use of these solutions, students produce user documentation using either web authoring or multimedia authoring software.

2. Information management
   This area of study focuses on information management and its importance to organisations. Students investigate the strategies used by organisations to store, communicate and dispose of their data and information. They examine the nature of threats to this data and information, whether accidental, deliberate or technical and use evaluation criteria to consider the subsequent consequences for ineffective information management strategies. Students recommend information management strategies to protect the integrity and security of data and information, taking into account key legal obligations of organisations and any ethical dilemmas faced by organisations and individuals regarding security of information.

Unit Outcomes
On completion of Units 3&4 the student should be able to:
- Apply stages of the problem-solving methodology to create a prototype website that meets an online community’s needs
- Explain the technical requirements to support the hosting of this website
- Design, and develop using a relational database management system, a solution to an information problem
- Discuss why and how data is acquired via websites
- Use selected software to solve an ongoing information problem
- Evaluate the efficiency and effectiveness of the solution in meeting the information needs of an organisation
- Evaluate the effectiveness of strategies used by organisations to manage the storage, communication and disposal of data and information
- Recommend improvements to current practices
Languages Other Than English – French and Japanese

Units 1 – 4
Common Areas of Study

Unit Description
The areas of study for LOTE comprise themes and topics, grammar, text types, vocabulary and kinds of writing. 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 grammar, vocabulary, text types and kinds of writing 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 outcomes.

Themes and topics
There are three prescribed themes with a number of prescribed topics.

French
• The individual (Personal world, Education and aspirations, Personal opinions and values)
• The French-speaking communities (Lifestyles, Historical perspective, Arts and entertainment)
• The changing world (Social issues, World of work, Scientific and technological issues)

Japanese
• The individual (Personal world, Daily life, Past and future)
• The Japanese-speaking communities (Visiting Japan, Life in Japan, Getting to know people in Japan)
• The changing world (The world of work, Changes in daily life, Home and neighbourhood)

Unit 1
On completion of this unit the student should be able to:
• Establish and maintain a spoken or written exchange related to personal areas of experience
• Listen to, read and obtain information from written and spoken texts
• Produce a personal response to a text focusing on real or imaginary experience

Unit 2
On completion of this unit the student should be able to:
• Participate in a spoken or written exchange related to making arrangements and completing transactions
• Listen to, read and extract and use information and ideas from spoken and written texts
• Give expression to real or imaginary experience in written or spoken form

Unit 3
On completion of this unit the student should be able to:
• Express ideas through the production of original texts
• Analyse and use information from spoken texts
• Exchange information, opinions and experiences

Unit 4
On completion of this unit the student should be able to:
• Analyse and use information from written texts
• Respond critically to spoken and written texts which reflect aspects of the language and culture of French/Japanese-speaking communities

Detailed study
The student is required to undertake a detailed study during Units 3 and 4: Language and culture through texts
Unit Description
The law influences all aspects of society – at home, at work and in the wider community. Laws are used by society to preserve social cohesion, and to ensure the protection of people from harm and from the infringement of their rights. These laws can be grouped according to their source and whether they are criminal or civil in nature. Following an overview of the law in general, this unit focuses on criminal law.

Areas of Study
1. Law in Society
   All societies have rules and laws that govern the behaviour of individuals and groups so that order is maintained and individual rights are protected. Students develop an understanding of the role of the law and the need for effective laws, as well as the concept that the law confers rights and responsibilities on members of society in their dealings with each other.

2. Criminal Law
   Criminal law regulates conduct in society in order to protect the community, as well as sanction those who commit crimes. Students develop an appreciation of the importance of criminal law by investigating its principles, types of crimes and their enforcement, and possible outcomes.

3. The Criminal Courtroom
   Criminal cases are heard across a number of courts in the Victorian court hierarchy and these are subject to specific processes and procedures. Students investigate procedures that are used prior to bringing a criminal case to trial, as well as the role and jurisdiction of the courts in hearing criminal cases. The adversarial nature of criminal courts is examined, as well as a consideration of the role and operation of juries in criminal cases.

Unit Outcomes
On completion of this unit the student should be able to:
- Describe the main sources and types of law in society and the need for effective laws
- Explain the key principles and types of criminal law, apply the key principles to relevant cases and discuss the impact of criminal activity on the individual and society
- Explain the processes for the resolution of criminal cases, and discuss the capacity of these processes to achieve justice
Unit Description
The civil law regulates the rights and responsibilities that exist between individuals, groups and organisations. If legal rights have been infringed, the aggrieved party may pursue legal action through the court system, through a tribunal, or by using one of the methods of dispute resolution. Students examine the rights that are protected by civil law, as well as obligations that laws impose. They investigate types of civil laws and related cases and issues and develop an appreciation of the role of civil law in society and how it affects them as individuals.

Areas of Study
1. Civil Law
   Civil law protects the rights of individuals, groups and organisations in society. Such rights establish responsibilities regarding conduct. Students gain an insight into the importance of civil law in their lives and learn to distinguish between civil and criminal law. They also examine how a situation can result in both criminal and civil action. Students develop an understanding of the process of lawmaking by judges and courts through the operation of the doctrine of precedent and through statutory interpretation. They explore torts and their related defences. Throughout this area of study students apply civil law principles to relevant cases and issues.

2. The Civil Law in Action
   Students investigate the role and operation of dispute resolution bodies and the methods employed in resolving civil disputes. For those disputes that proceed to court, students examine the purpose and operation of civil pre-trial procedures and the adversarial nature of a civil trial, and evaluate the methods of dispute resolution. Students investigate available remedies and examine their effectiveness. They consider the difficulties faced by parties when attempting to resolve disputes.

3. The Law in Focus
   Civil law protects a wide range of rights that exists between parties. The extent and principles of civil rights and responsibilities need to develop along with changes in society, and this creates issues for the law. Students undertake a detailed investigation of a specific area of the law. To develop knowledge and understanding about contemporary issues in the law and their resolution, students consider one or more of the following areas of law: • Contract law • Family law • Consumer protection laws • Workplace laws • Wills and inheritance • Sports and the law • Tenancy law • Environmental law

4. A Question of Rights
   Individuals can make an impact on the legal system in a number of ways, one of which is the pursuit of cases through the courts. In this area of study students examine an instance where an individual or group has suffered an abuse of their rights and sought redress through the court system. Students investigate an Australian case and develop an understanding of ways in which individuals can shape the law, and examine instances of people being empowered by the legal system. Students discuss the impact of this case on the legal system and the rights of individuals.

Unit Outcomes
On completion of this unit the student should be able to:
- Explain the principles of civil law, law-making by courts, and elements of torts, and apply these to relevant cases
- Explain and evaluate the processes for the resolution of civil disputes
- Explain one or more area/s of civil law, and discuss the legal system’s capacity to respond to issues and disputes
- Describe an Australian case illustrating rights issues, and discuss the impact of the case on the legal system and the rights of individuals
Legal Studies

Unit 3
Legal Studies

Unit Description
The purpose of this unit is to enable students to develop an understanding of the institutions that determine laws and the processes by which laws are made. It considers the reasons why laws are necessary and the impact of the Commonwealth Constitution on the operation of the legal system.

Areas of Study
1. Parliament and the Citizen
Parliaments are the supreme law-making bodies in the Australian legal system; their role is to make laws that reflect the views and values of Australian society. This area of study focuses on the principles that underpin the Australian parliamentary system as well as an investigation of parliament as a lawmaking body. Students explore the factors that may influence parliament in bringing about changes in the law by examining the role that individuals and groups may play. Through an investigation of the structure and role of parliament, and the processes it follows in passing legislation, students evaluate the overall effectiveness of parliament as a law-making body.

2. The Constitution and the Protection of Rights
In this area of study students investigate the role of the Commonwealth Constitution in establishing and restricting the law-making powers of State and Commonwealth Parliaments. Students examine how these law-making powers can be changed and analyse the impact of these methods. They investigate the role of the High Court with respect to law-making powers and the protection of rights contained in the Constitution. Students explore the means by which the Commonwealth Constitution protects rights in Australia and develop an awareness of the rights in Australia and develop an awareness of the rights and responsibilities of Australian citizens. They engage in a comparison of the constitutional approach used to protect their rights in Australia with that of another country, raising their awareness of an alternative model for the protection of rights.

3. Role of the Courts in Law-making
In this area of study students develop an understanding of the role that courts play in developing the law. Students investigate the doctrine of precedent and statutory interpretation and consider their operation and effect. They evaluate the effectiveness of courts as a law-making body. Using relevant cases, students explore the relationships between courts and parliament in law-making.

Unit Outcomes
On completion of this unit the student should be able to:
- Explain the structure and role of parliament, including its processes and effectiveness as a law-making body, describe why legal change is needed, and the means by which such change can be influenced
- Explain the role of the Commonwealth Constitution in defining law-making powers with a federal structure, analyse the means by which law-making powers may change, and evaluate the effectiveness of the Commonwealth Constitution in protecting human rights
- Describe the role and operation of courts in law-making bodies and discuss their relationship with parliament.
Unit Description
This unit explores the function and jurisdiction of courts, tribunals and alternative avenues of dispute resolution with a view to comparing and evaluating the operation of various disputes resolution methods. Students develop an understanding of the criminal and civil pre-trial and trial processes and procedures, including the jury system that operates within the Victorian legal system. They also study the operation of the adversary system and compare it with the inquisitorial system.

Areas of Study
1. Dispute Resolution Methods
   There is a range of methods by which legal disputes can be resolved. Criminal cases are determined through the courts, whereas civil disputes can be resolved through a range of methods in courts and tribunals. Students investigate the jurisdictions of selected courts in the Victorian court hierarchy, and develop an understanding of the need for a hierarchy of courts. They examine the methods of dispute resolution used by courts and the Victorian Civil and Administrative Tribunal (VCAT) as a means of resolving civil disputes, and the way the institutions operate to resolve the disputes. Throughout their investigation, students compare and evaluate the operation of these dispute resolution methods.

2. Court Processes and Procedures, and Engaging in Justice
   Dispute resolution through courts operating under the adversary system of trial is characterised by formal processes and procedures that must be adhered to by all parties involved with the case. Students investigate the major features of the adversary system of trial and aided by a comparison with the inquisitorial system of trial evaluate the adversarial approach to dispute resolution. They also examine criminal and civil pre-trial and post trial procedures. Students investigate the role of criminal and civil juries, consider their strengths and weaknesses and suggest reforms and alternatives applicable to the current jury system. Throughout their investigation of court processes and procedures, students assess the extent to which these processes contribute to an effective legal system.

Unit Outcomes
On completion of this unit the student should be able to:
- Describe and evaluate the effectiveness of institutions for resolving civil and criminal disputes
- Explain the processes and procedures for the resolution of criminal cases and civil disputes, and evaluate their operation and application, and evaluate the effectiveness of the legal system
Literature

Unit 1
Approaches to Literature

This course is designed as a broad introduction to the study of Literature, introducing students to texts in a range of genre, points of view and techniques used in prose, poetry and drama.

Unit Description
In this unit students focus on the ways in which interactions between text and reader creates meaning. Students analyse the conventions of texts in a range of literary forms and styles and respond critically, creatively and reflectively. They develop familiarity with key terms, concepts and practices that equip them to undertake further studies in Literature.

Areas of Study
1. Reading practices
   • This area of students consider how language structure and stylistic choices are used in different literary forms and types of text, including both print and non-print texts. Students reflect on the degree to which points of view, experience and contexts shape responses to text. They engage with other views about texts and develop an awareness of how these views may influence and enhance their own reading of a text

2. Ideas and concerns in texts
   • This area of study focuses on the representation of social and cultural contexts in texts and students focus on how texts question or support particular aspects of society. They examine the way texts explore different aspects of the human condition

Unit Outcomes
On completion of this unit the student should be able to:
• Discuss how personal responses to literature are developed and justify their own responses to one or more texts
• Analyse and respond both critically and creatively to the ways in which one or more texts reflect or comment on the interests and ideas of individuals and particular groups in society
• Analyse the construction of a print or non-print text and comment on the ways it represents an interpretation of ideas and experiences
Unit 2: Context and Connections

Unit Description
In this unit students explore the ways literary texts connect with each other and the world. They deepen their examination of the ways their own culture and cultures represented in the text can influence their interpretations and shape different meaning.

Areas of Study
1. The text, the reader and their contexts
   - This area of study focuses on student analysis and responses, both critical and creative, to a text from a past era. The students examine the social and cultural concerns and values. They identify the language and representations in the text

2. Exploring connections between texts
   - This area of study focuses on the way texts relate to and influence one another. Students consider how the reading of the text can change according to the form of the text and its context

Unit Outcomes
On completion of this unit the student should be able to:
- Identify the ways in which a text from a past era reveals the ideas and concerns of individuals and groups at that time
- Produce a comparative piece of interpretative writing with a particular focus
Unit 3

Unit Description
This unit focuses on the ways writers construct their work and how meaning is created. Students consider form, views and values and the human experience as well as the social, historical and cultural contexts of literary works.

Areas of Study
1. Adaptations and transformations
   • A close study of form and genre, to understand the features of particular forms and how meaning changes when the form is changed

2. Views, values and contexts
   • Consideration of the ways in which views and values are expressed to create particular perspectives of the world. Students inquire into the ways readers may arrive at differing interpretations and judgments about a text

3. Considering alternative viewpoints
   • Students engage in the viewpoints of others in reviews, critical essays and commentaries. Students show how content is shaped and structured and how they are positioned by the writer’s choice of language

Unit Outcomes
On completion of this unit the student should be able to:
• Analyse how meaning changes when the form of a text changes
• Analyse, interpret and evaluate the views and values of a text
• Evaluate views of a text and make comparisons with their own experience
Unit Description
This unit focuses on students’ creative and critical responses to texts. Students consider contexts of their responses as well as the concerns, style and point of view in their creative response.

Areas of Study
1. Creative responses to texts
   • The students focus on imaginative techniques for re-creating a literary work. This helps them to understand the writer’s concerns and craft. They will discuss the purpose and context of their response

2. Close analysis
   • This area focuses on detailed scrutiny of style, concerns and construction of a text. Students closely examine textual details to identify features which contribute to their overall interpretations

Unit Outcomes
On completion of this unit the student should be able to:
• Respond imaginatively to a text and comment on the connections between the text and the response
• Analyse critically features of a text, relating them to an interpretation of the text as a whole
Mathematics Overview

In 2016 there will be three Units 1 and 2 studies: General Mathematics, Mathematical Methods and Specialist Mathematics. Units 3 and 4 consists of three studies: Further Mathematics, Mathematical Methods and Specialist Mathematics.

The following should be noted:

- Your mathematics course at Units 1 and 2 will be largely determined by what you are considering studying at Units 3 and 4, and your interest in mathematics.
- To study Mathematical Methods Units 3 and 4 you must have completed Mathematical Methods Units 1 and 2, and will have a much firmer basis if you have also completed Specialist Mathematics.
- To study Specialist Mathematics Units 3 and 4 you must have completed Specialist Mathematics Units 1 and 2, and be enrolled in, or have completed, Mathematical Methods Units 3 and 4.
- When making decisions about which VCE Mathematics units to undertake, students should refer to current information about tertiary entrance requirements and selection procedures.

When choosing your sequence of mathematics units, consider your possible choices in Units 3 and 4, then refer to the possible sequences of Units 1 and 2 studies shown below.

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General Mathematics

Units 1 and 2

Unit Description
The areas of study are Algebra and structure, Arithmetic and number, Discrete mathematics, Graphs of linear and non-linear relations, and Statistics.

Areas of Study
1. Algebra and structure, which includes
   - solution of linear equations, including literal linear equations
   - developing formulas from word descriptions and substitution of values into formulas
   - numerical, graphical and algebraic solutions of simultaneous linear equations
   - application of equations to solve practical problems

2. Arithmetic and number, which includes
   - scientific notation, rounding correct to a given number of significant figures
   - use of ratios, proportions, percentages and percentage change to solve practical problems
   - percentage increase and decrease applied to various financial contexts
   - applications of simple interest and compound interest
   - comparison of purchase options including credit, debit cards and hire purchase

3. Discrete mathematics, which includes
   - matrix addition, subtraction, multiplication by a scalar, and matrix multiplication
   - use of matrices to model and solve problems
   - inverse matrices and their applications including solving a system of equations
   - the concept of a sequence as a function
   - generation of an arithmetic or geometric sequence using a recurrence relation

4. Graphs of linear and non-linear relations, which includes
   - review of linear functions and graphs
   - the construction of a linear model to represent a practical situation
   - linear inequalities in one and two variables and their graphical representation
   - the concepts of feasible region, constraint and objective function
   - use of the corner-point principle to determine solution/s of linear programming problems

5. Statistics, which includes
   - display and description of categorical data and numerical data
   - measures of centre and spread, the five-number summary and the boxplot
   - use of back-to-back stem plots or parallel boxplots
   - scatterplots, the Pearson correlation coefficient $r$, and correlation and causation
   - use of the least squares line to model an observed linear association

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the selected content from the areas of study, and apply a range of related mathematical routines and procedures
- Select and apply mathematical facts, concepts, models and techniques from the topics covered in the unit to investigate and analyse extended application problems in a range of contexts
- Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques
Mathematical Methods

Units 1 and 2

Unit Description
The areas of study are Functions and Graphs, Algebra, Calculus, and Probability and Statistics. There will be a progressive development of skills and knowledge with connections across the two areas of study being developed consistently throughout Unit 1 and 2.

Areas of Study
1. Functions and graphs, which includes
   - Coordinate geometry
   - Functions and function notation
   - Graphs of power functions, polynomial functions and inverse functions
   - The unit circle, radians and exact trigonometric values
   - Graphs and applications of trigonometric functions
   - Exponential and logarithmic functions; their graphs and applications

2. Algebra, which includes
   - Transformations of the plane and application to basic functions and relations
   - The remainder, factor and rational root theorems
   - Solution of polynomial equations, numerically, graphically and algebraically
   - Solution of a set of simultaneous linear equations
   - The solution of equations involving sine, cosine, tangent
   - Index laws, logarithm laws, and their application to the solution of exponential equations

3. Calculus, which includes
   - Average and instantaneous rates of change
   - Graphs of the gradient function
   - The derivative as the gradient of the graph of a function at a point
   - Derivatives of simple power functions and polynomial functions by rule
   - Applications of differentiation
   - Anti-differentiation and its applications

4. Probability and Statistics, which includes
   - Simulation using simple random generators
   - Probability of elementary and compound events
   - Conditional probability and Independent events
   - The concept of a selection and its application of counting techniques to probability.

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the selected content from the areas of study, and apply a range of related mathematical routines and procedures
- Select and apply mathematical facts, concepts, models and techniques from the topics covered in the unit to investigate and analyse extended application problems in a range of contexts
- Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques
Unit Description
The areas of study are Algebra and structure, Arithmetic and number, Discrete mathematics, Geometry, Measurement and trigonometry, Graphs of linear and non-linear relations, and Statistics.

Areas of Study
1. Number systems and recursion, which includes
   - Arithmetic and geometric sequences
   - Proof by mathematical induction
   - Definition and properties of the real and complex numbers
2. Geometry in the plane and proof, which includes
   - Geometric objects and relations
   - Principles of proof
   - Sine and cosine rules including applications
   - Proof of circle theorems
3. Vectors in the plane, which includes
   - Representation of a vector in the form \( a \hat{i} + b \hat{j} \)
   - Simple vector algebra
   - Scalar product, perpendicular and parallel vectors and the angle between two vectors
   - Application of vectors to geometric proofs
4. Graphs of non-linear relations, which includes
   - Graphs of simple reciprocal functions, including those for sine, cosine and tangent
   - Cartesian, polar and parametric forms and graphs of various forms
   - Polar form and graphs of other relations in the plane
   - Parametric form and graphs of other relations in the plane
5. Kinematics, which includes
   - Diagrammatic and graphical representation of empirical position-time data for a single particle in rectilinear motion, including examples with variable velocity
   - Graphical modelling and numerical analysis of position-time and velocity-time
   - Motion under constant acceleration, including use of constant acceleration formulas
   - Graphical analysis of the relationship between position-time, velocity-time and acceleration-time graphs for simple cases of rectilinear motion involving variable acceleration
6. Simulation, sampling and sampling distributions, which includes
   - Random experiments, events and event spaces
   - Simple random sampling from a finite population
   - Distinction between a population parameter and a sample statistic
   - Comparing distributions of different size samples from the same population
   - The mean and standard deviation

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the selected content from the areas of study, and apply a range of related mathematical routines and procedures
- Select and apply mathematical facts, concepts, models and techniques from the topics covered in the unit to investigate and analyse extended application problems in a range of contexts
Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving
Further Mathematics

Units 3 and 4

Unit Description
Further Mathematics consists of two areas of study, a compulsory Core area of study to be completed in Unit 3 and an Applications area of study to be completed in Unit 4. The Core comprises Data analysis, and Recursion and financial modelling. The two modules from the ‘Applications’ area of study are Graphs and relations, and Matrices.

Areas of Study
1. Core - Data analysis
   - Investigating data distributions and associations between two variables
   - Investigating and modelling linear associations, and time series data

2. Core – Recursion and financial modelling
   - Depreciation of assets
   - Compound interest investments and loans
   - Reducing balance loans, compound interest loans with periodic repayments
   - Annuities and perpetuities, compound interest investments with periodic payments
   - Compound interest investment with periodic and equal additions to the principal

3. Module – Graphs and relations
   This module covers the use of linear relations, including piecewise defined relations, and non-linear relations to model a range of practical situations and solve related problems, including optimisation problems by linear programming
   Construction and interpretation of graphs, including
   - straight-line graphs, line segments and step graphs
   - simultaneous linear equations
   - interpretation of non-linear graphs
   Linear programming, including
   - review of linear inequalities, linear programming and its purpose

4. Module – Matrices
   This module covers definition of matrices, different types of matrices, matrix operations, transition matrices and the use of first order linear matrix recurrence relations to model a range of situations and solve related problems
   Matrices and their applications, including
   - review of matrix arithmetic, inverse of a matrix and its determinant
   - use of matrices
   Transition matrices, including
   - use of the matrix recurrence relations and use of transition diagrams

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the Core Area of Study, and apply related mathematical techniques and models in routine contexts
- Select and apply the mathematical concepts, models and techniques as specified in the Core Area of Study, in a range of contexts of increasing complexity
- Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques
Mathematical Methods

Unit 3 and 4

Unit Description
The areas of study are Functions and Graphs, Algebra, Calculus, and Probability and Statistics.

Areas of Study
1. Functions and Graphs, which includes
   - Graphs of polynomial, power, exponential, logarithmic, circular and modulus functions
   - Graphs derived from others, using transformations
   - Graphs of sum, difference, product, and composite of functions

2. Algebra, which includes
   - Use of simple functional relations, Functions and their inverses, Composition of functions
   - Solutions of equations involving trigonometric, exponential and logarithmic functions
   - Solutions of systems of simultaneous linear equations

3. Calculus, which includes
   - Derivatives of polynomial, exponential, logarithmic and circular functions
   - The product, quotient and chain rule
   - Deducing the graph of the gradient function from a given function
   - Applications of differentiation
   - Anti-derivatives of polynomial, exponential and circular functions
   - Properties of anti-derivatives and definite integrals, and applications of integration

4. Probability and Statistics, which includes
   - Discrete and continuous random variables
   - Calculation and interpretation of the mean, variance and standard deviation of discrete random variables and for continuous random variables
   - Bernoulli and the Binomial distributions
   - The Normal distribution

   Distinction between a population parameter and a sample statistic
   - The sample proportion as a random variable whose value varies between samples
   - Approximate normality of the distribution of the sample proportion for large samples
   - Simulation of random sampling, for a variety of values
   - Determination of an approximate confidence interval for a population proportion

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the Core Area of Study, and apply related mathematical techniques and models in routine contexts
- Select and apply the mathematical concepts, models and techniques as specified in the Core Area of Study, in a range of contexts of increasing complexity
- Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques
Specialist Mathematics

Units 3 & 4

Unit Description
The areas of study are Functions and graphs, Algebra, Calculus, Vectors, Mechanics, and Probability and Statistics. The development of course content should highlight mathematical structure, reasoning and applications across a range of modelling contexts.

Areas of Study

1. Functions and graphs, which includes
   - The absolute value function, its graph and simple transformations of the graph
   - Compound and double angle formulas for sine, cosine and tangent
   - Graphs of the inverse circular functions of sine, cosine and tangent

2. Algebra, which includes
   - The expression of rational functions as sums of partial fractions.
   - Complex numbers and polar form of a complex number
   - Use of an argand diagram to represent points, lines, rays and circles
   - Factorisation of polynomial functions of a single variable over C

3. Calculus, which includes
   - Derivatives of inverse circular functions
   - Determination of the second derivative and its applications and implicit differentiation
   - Anti-differentiation, definite integrals and applications of anti-differentiation
   - Applications to rectilinear motion of a single particle

4. Vectors, which includes
   - Addition, subtraction and multiplication by a scalar
   - Linear dependence and independence
   - Scalar product of two vectors and the resolution of vectors
   - Vector proofs
   - Differentiation and anti-differentiation of a vector function with respect to time

5. Mechanics:
   - Inertial mass, momentum, force, resultant force, weight, action and reaction.
   - Equations of motion.
   - Motion of a body without friction

6. Probability and Statistics, which includes
   - Linear combinations of random variables
   - Concept of the sample mean as a random variable
   - Simulation of repeated random sampling from a variety of distributions
   - Determination of confidence intervals for means
   - Construction of an approximate confidence interval

Unit Outcomes
On completion of this unit the student should be able to:
- Define and explain key concepts as specified in the Core Area of Study, and apply related mathematical techniques and models in routine contexts
- Select and apply the mathematical concepts, models and techniques as specified in the Core Area of Study, in a range of contexts of increasing complexity
- Select and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques
**Unit Description**
In this unit students develop an understanding of the relationship between the media, technology and the representations present in media forms. They study the relationships between media technologies, audiences and society. Students develop practical and analytical skills, including an understanding of the contribution of codes and conventions to the creation of meaning in media products, the role and significance of selection processes in their construction, the role audiences play in constructing meaning from media representations, and the creative and cultural impact of new media technologies.

**Areas of Study**

1. **Representation**
   This area of study focuses on an analysis of media representations and how such representations depict, for example, events, people, places, organisations and ideas.

   Students learn that media texts are created through a process of selection, construction and representation. Representations of events, ideas and stories, which may appear natural and realistic, are mediated and constructed in ways that are different from the audience's direct experience of reality. Students develop an understanding of how media representations are subject to multiple readings by audiences who construct meaning based on a range of personal, contextual, social and institutional factors.

   Representation involves the selection of images, words, sounds and ideas and the ways in which these are presented, related and ordered. Media codes and conventions, together with such factors as degrees of intended realism, the cultural and historical context of the production and institutional practices, help shape a product's structure and meaning. Media products are approached in terms of how they are constructed for different purposes, their distribution and the ways audiences may read representations within them.

2. **Technologies of representation**
   In this area of study students produce representations in two or more media forms. Students analyse how the application of the different media technologies affects the meanings that can be created in the representations. The implications for the creation, distribution and consumption of these representations are also discussed.

   Media technologies, materials, techniques, applications and processes are used to construct representations in a variety of ways. Different media forms may have features and practices in common, but in production display unique characteristics or practices. Students consider the use of codes and conventions to convey ideas and meaning in representations within the context of the technologies used to construct these representations.

3. **New media**
   In this area of study students explore the emergence of new media technologies. The impact and implications of new media technologies are considered in the context of the capabilities of the technologies, their relationship with existing media and how they provide alternative means of creation, distribution and consumption of media products. Students investigate the changes, possibilities and issues that arise from the development of new technologies and how these alter audience experience and understanding of the media.

   Technological advancements in the media occur within the context of the society in which they are created, developed and used. Such developments, therefore, not only affect media products themselves but also change the ways audiences think about and use the media. New media may also influence perceptions of ourselves and the world. Students learn that development, convergence and proliferation of technologies change the way existing and new forms of media are transmitted, exchanged, stored and received. They develop an understanding that these changes may also challenge notions of industry, ownership, copyright, privacy and access.
Unit Description
In this unit students develop their understanding of the specialist production stages and roles within the collaborative organisation of media production. Students participate in specific stages of a media production, developing practical skills in their designated role. Students also develop an understanding of media industry issues and developments relating to production stages and roles and the broader framework within which Australian media organisations operate.

Areas of Study
1. Media production
   This area of study focuses on media production undertaken by students within a collaborative context and the student's explanation of the process.

   All media representations are constructed through a production process. Production is usually undertaken in stages, often grouped under the headings of preproduction, production and postproduction, with segments of the various stages undertaken by specialist individuals or teams. Media practitioners perform specific roles in the development of a media product from its inception to completed production, distribution and/or exhibition. Students develop an understanding that as each media product progresses through the various stages of production, the work practices and conventions of each specific stage and role help shape the nature of the final media product. When students undertake their production they maintain documentation that includes preproduction media design documents, such as a treatment, screenplay, storyboards or page layouts. This documentation also identifies their involvement, responsibilities and understanding of the stages and roles in the media production process.

2. Media industry production
   In this area of study students focus on national, international and global media industry issues, and the developments in the media industry and their impact on media production stages, and specialist roles within these stages.

   Media products are the result of collaborative and specialist production stages and roles. Students learn that the degree of specialisation among production personnel varies according to the scale and context of the media production process, and that specialist stages and roles require different skills and training. They learn that employment in the industry depends on factors such as the degree of specialism required and funding of media productions, and that the work of media practitioners is influenced by developments and issues within the industry.
Areas of Study continued..

3. Australian media organisations

In this area of study students analyse Australian media organisations within a social, industrial and global framework.

Media products are produced for audiences within a cultural, aesthetic, legal, political, economic, institutional and historical framework. Students learn that their production, distribution and circulation are affected by laws, self-regulatory codes of conduct, industry pressures, the practices of particular media organisations and global trends. They also learn that other factors, for example, sources of revenue, ratings, circulation and distribution, and ownership and control, influence the nature and range of texts produced by media organisations.

Unit Outcomes

On completion of Units 1&2 the student should be able to:

• Describe the construction of specific media representations explain how the process of representation reproduces the world differently from direct experience of it construct media representations in two or more media forms compare these representations that are produced by the application of different media technologies
• Discuss creative and cultural implications of new media technologies for the production and consumption of media products
• Demonstrate specialist production skills within collaborative media productions
• Explain and reflect on the media production process media industry issues and developments relating to the production stages of a media product
• Describe specialist roles within the media industry
• Describe characteristics of Australian media organisations
• Discuss the social, cultural and industrial framework within which such organisations operate
Unit Description
In this unit students develop an understanding of film, through the study of production and story elements, and learn to recognise the role and significance of narrative organisation in fictional film, and/ or television texts. Students examine how production and story elements work together to structure meaning in narratives to engage audiences. Students also develop practical skills through undertaking exercises related to aspects of the design and production process. They complete a media production design plan for a specific media form and audience. They present the relevant specifications as a written planning document, with visual representations that employ media planning conventions appropriate to the media form in which the student chooses to work.

Areas of Study
1. Narrative
   In this area of study students analyse the narrative organisation of two fictional film texts. Students learn that narrative is a fundamental element in the construction of meaning in media products. Production and story elements structure an audience's experience of narratives and contribute to the ideas communicated by the text. The nature of the viewing experience also contributes to audience reading and appreciation of narrative texts

   On completion of this outcome the student should be able to analyse the nature and function of production and story elements in narrative media texts, and discuss the impact of these elements on audience engagement. Assessment is in the form of written questions

2. Media production skills
   This area of study focuses on the development of specific media production skills and technical competencies using media technologies and processes in one or more media forms. Students plan, undertake and evaluate two production exercises to develop skills appropriate to the technical equipment, applications and media processes available to them. Each media production exercise is accompanied by a statement of intention and an evaluation specific to the exercise. Through the completion of production exercises, students develop an understanding of the possibilities and limitations of production equipment, processes and applications; acquire skills to enable the use of specific media technologies; and explore aesthetic and structural qualities and characteristics of media products in media forms. Students' production skills inform the development of their media production design plan and the subsequent media production developed in Unit 4. Students document their planning and evaluation processes, and use this information to support the development of their media production design plan in Outcome 3

3. Media production design
   In this area of study, students focus on the preparation of a production design plan for a media product designed for a specific audience in a selected media form. (Either print, photography, film, digital or radio). The design of a media production is an essential creative and organisational stage of the production process. Students develop and record concepts and ideas for production, documenting the intention of the proposed production, the audience/s for which the production is planned, how and where the production is designed to be consumed, and the intended effects on the specified audience. Media production design planning also details written and visual representations of the proposed production, including technical specifications appropriate to the selected media form, style and intention of the production. The design planning process varies from medium to medium, with each employing planning conventions specific to the proposed production and form and with consideration of the specified audience. On completion of this unit the student should be able to prepare and document a media production design plan in a selected media form for a specified audience.
Media

Unit 4
Media: Process, Influence and Society’s Values

Unit Description
In this unit students further develop practical skills in the production of media products to realise the production design plan completed during Unit 3. Organisational and creative skills are refined and applied throughout each stage of the production process.

Students also analyse the relationship between media texts, social values and discourses in the media. The nature and extent of media influence, the relationship between the media, media audiences and media regulation are also critically analysed in this unit.

Areas of Study
1. Media process
   In this area of study students complete a media product based on the media production design plan completed in Unit 3. Each medium has a specific production process and set of work practices that are both appropriate to the particular medium and to the type of product being produced within that form. Each type of media product, however, requires the integration of a variety of skills, management and organisational techniques to move from planning documentation through production and postproduction processes to a completed media product. These vary depending on the nature of the product. Production and postproduction processes involve the application of media codes and conventions and stylistic considerations appropriate to the selected medium and for specific audience/s and purpose of the product.

   On completion of this outcome the student should be able to produce a media product (film, photography, print, web, digital or radio) for an identified audience from the media production design plan prepared in Unit 3

2. Media texts and society’s values
   In this area of study students focus on the relationship between society's values and media texts. Media representations reflect and mediate ideas from particular economic, social, cultural, political or institutional points of view. Students undertake the study of an identified significant idea, social attitude or discourse located in a range of media texts to critically analyse its representation in the media.

   Media texts are subject to multiple readings by audiences. Society's values shape the construction and reading of texts. These values are in a state of constant evolution, and tension always exists between dominant, oppositional and emerging values. The media play a significant role in the construction, maintenance and conduct of social knowledge and discourses through the process of making and reproducing meaning using the representational tools of language, image and sound to construct and distribute ideas and attitudes in texts.

   This process reflects the structures of power and knowledge in society and may take the form of ongoing discussions or be specific to particular ideas, events, people or times.

   Society's values or attitudes may be linked to particular moral, political or other views. These may include, for example, attitudes held about or directed towards particular individuals or groups, forms of social organisation (such as the family, political or social structures), institutions or organisations, the natural or built environment, events in which individuals, particular social groups or nations are involved or participate, or forms of behaviour attributed to factors such as age, class, gender, sub-culture, region and ethnicity.
Areas Of Study continued..

3. Media influence
   This area of study focuses on an analysis of media influence. Students explore the complexity of the relationship between the media, its audiences and the wider community in terms of the nature and extent of the media's influence. Students examine arguments and evidence arising from a range of historical and contemporary developments that offer a range of perspectives about the nature, characteristics and extent of media influence on individuals and society at large. Theories of media influence and communication models are underpinned by academic approaches, including the political economy model, the effects tradition and the cultural studies model. Over time these theories have become increasingly sophisticated as they seek to explain the complexities in the relationships between the media and its audiences.

Audiences are central to the construction and dissemination of media products. They are active in media consumption and increasingly involved in media creation and distribution. Developments in media technologies, forms and texts and the changes that result in terms of the construction, distribution, consumption and regulation of media products have fundamentally changed the relationship between the media and its audiences. Students examine the nature and extent of media influence in the light of these developments.

The media is subject to regulation including government, industry and self-regulation on production, distribution, content and reception. Codes of conduct and regulations may define standards, set limitations or place ethical parameters on the media. Students consider the rationale for, and arguments about, such controls when discussing issues of media influence. Assessment is in the form of written questions. On completion of this unit the student should be able to analyse and present arguments about the nature and extent of media influence.

Unit Outcomes
On completion of Units 1&2 the student should be able to:
- Discuss and analyse the construction, distribution and interpretation of society's values as represented in media texts.
Music Performance

Unit 1

Unit Description
This unit focuses on performance in solo and group contexts, studying approaches to performance and performing and developing skills in aural comprehension. Students present a solo and group performance, demonstrate prepared technical work and perform previously unseen music.

Areas of Study
1. Performance skill development:
   - Practice and performance of the solo technical work on the main instrument for development and maintenance of control and dexterity, range of styles and performance techniques
   - Practice and performance of prepared program of solo and group work by a range of composers and./or performers with differentiation between the works
   - Interpretation and, where appropriate, improvisation in the style being prepared or for the performance
   - Performance techniques showing cooperation and empathy with an accompanist as appropriate to the instrument
   - Presentation techniques of music performance appropriate to the style presented in the work.
   - Fluent performance of unprepared material

2. Music craft:
   - Approaches used by other performance to optimise performance that can assist the development of the students work
   - Selected influences on the works being prepared for the performance
   - Ways of improving identified aspects of the student’s performance

3. Music language for performance:
   - Different ways scales forms, harmony, duration and texture are used individually and in combination by a range of composers, arrangers and creators of music
   - Scale forms, including major harmonic and both melodic minor forms
   - Diatonic intervals in a melodic context
   - Chords and chord progression in major and minor keys
   - Rhythms, including those in simple quadruple and triple time
   - Structures of melodies in a variety of major and minor keys
   - Conventions in music notation that will assist students to increase sensitivity in interpreting music

Unit Outcomes
On completion of this unit the student should be able to:
- Perform a program of contrasting solo and group works, selected solo technical works and works that demonstrate unprepared performance skills
- Analyse and evaluate the selected influences on works being prepared for performance and approaches that can be used to optimize performance of those works
- Describe how instruments are used in combination using selected elements of music, and recognize, sing and write scales, intervals, chords and rhythms using conventions in music notation
Music Performance

Unit 2

Unit Description
This unit continues the development of accuracy, control, flexibility and dexterity in music performance skills on
an instrument as a soloist and in a group. Students interpret and perform a range of styles using a diverse range
of performance techniques.

Areas of Study
1. Performance skill development:
   - Practice and performance of solo technical work on the main instrument for development and
     maintenance of accuracy, control, flexibility and dexterity, range of styles and performing techniques
   - Practice and performance of a prepared program of solo and group works by a range of composers
     and/or performers
   - Interpretation and where appropriate improvisation of the style being prepared for performance
   - Performance techniques showing cooperation and empathy with an accompanist where appropriate
to the instrument
   - Presentation techniques of music performance appropriate to the style represented in the work
   - Background of composers and/or performers and socio-cultural and/or geographic influences relevant
to performance of selected work
   - Fluent performance of unprepared material
   - Expressive use of solo instruments in combination, including balance of dynamics and tones, and
     blend of tones

2. Contextual issues and analysis of works:
   - Background of composers and/or performers and issues relevant to the performance of selected
     works
   - Form or structure of works looking at the whole work or a major section of a work
   - Characteristic patterns in selected works that are expressive or have meaning
   - Characteristic ways textures are used to shape the musical statement in selected works
   - Characteristics of selected works that are typical of historical music stylistic periods
   - Characteristics of composers and/or performer’s individual styles presented in selected works
   - Characteristics in selected works that use elements of music and combine elements of music
   - Expressive use of solo instruments in combination, including balance of dynamics and tones and blend
     of tones
   - Music examples and other graphic representation in selected works

3. Music language for performance:
   - Rhythms structures for recognition, singing and transcription
   - Pitch structures for recognition, singing and transcription
   - Conventions in traditional music notation on a music manuscript
   - Characteristic and idiomatic use of instruments in orchestrations and arrangements
   - Expressive use of solo instrument/s in combination, including balance of dynamics and tones and
     blend of tones

4. Creative organisation of sound:
   - Aspects of music language used in devising original work include range and characteristics of different
     instruments in orchestrations and arrangements
   - Use of instruments in combination
   - Music forms and structures
   - Conventions in traditional music notation on music manuscript
Unit Outcomes
On completion of this unit the student should be able to:

- Demonstrate developing performance and presentation skills in performing a program of contrasting solo and group works, selected technical work and work that demonstrates unprepared performance.
- Discuss the contextual issues and describe the characteristics and style represented in the works, the structure of the works and expressive features relevant to performance of works selected for performance.
- Recognise, sing and write scales, interval and chords; transcribe rhythms and melodies; use conventions in music notations and describe how instruments are used in combination.
- Devise a composition or improvisation that uses music language drawn from an analysis of selected works prepared for performance.
Physical Education

Unit 1
Bodies in Motion

Unit Description
In this unit students explore how the body systems work together to produce movement and analyse this motion using biomechanical principles. They are introduced to the aerobic and anaerobic pathways utilised to provide the muscles with the energy required for movement and the basic characteristics of each pathway. Students apply biomechanical principles to improve and refine movement. Students also study injury prevention and rehabilitation strategies.

Areas of Study

1. Body Systems and Human Movement
   This area of study students examine the systems of the human body and how they translate into movement. Through practical activities they explore the major components of the musculoskeletal, cardiovascular and respiratory systems and their contributions and interactions during physical activity. Anaerobic and aerobic pathways are introduced and linked to the types of activities that utilise each of the pathways.

2. Biomechanical Movement Principles
   In this area of study students examine biomechanical principles underpinning physical activity and sport. Through their involvement in practical activities, students investigate and analyse movements in a variety of activities to develop an understanding of how the correct application of biomechanical principles leads to improved performance.

3. Injury Prevention and Rehabilitation
   In this area of study, students focus on sports injury risk management strategies used to reduce the risk of injury to the participant/athlete, and the rehabilitation practices and processes an individual/athlete may use to ready them for a return to sport and physical activity. Students analyse and demonstrate a range of different strategies that may be implemented at a club, an administration, a coaching or an individual level.

Unit Outcomes
On completion of this unit the student should be able to:
- Collect and analyse information from, and participate in, a variety of practical activities to explain how the musculoskeletal, cardiovascular and respiratory systems function, and how the aerobic and anaerobic pathways interact with the systems to enable human movement.
- Collect and analyse information from, and participate in, a variety of practical activities to explain how to develop and refine movement in a variety of sporting actions through the application of biomechanical principles.
- Observe, demonstrate and explain strategies used to prevent sports injuries, and evaluate a range of techniques used in the rehabilitation of sports injuries.
Physical Education

Unit 2
Sports Coaching and Physically Active Lifestyles

Unit Description
This unit explores a range of coaching practices and their contribution to effective coaching and improved performance of an athlete. Students are introduced to physical activity and the role it plays in the health and wellbeing of the population. Through a series of practical activities, students gain an appreciation of the level of physical activity required for health benefits and investigate how participation in physical activity varies across the lifespan. They explore a range of factors that influence participation in regular physical activity, and collect data to identify perceived barriers and the ways in which these barriers can be overcome.

Areas of study
1. Effective coaching practices
   In this area of study students focus on the roles and responsibilities of a coach as well as looking at coaching pathways and accreditation. Students apply the various coaching skills by participating in practical coaching activities

2. Physically Active lifestyles
   This area of study focuses on the range of physical activity options in the community. Health benefits of participation in regular physical activity and health consequences of physical inactivity and sedentary behaviour are explored at individual and population levels. Students explore the dimensions of the National Physical Activity Guidelines and investigate the current status of physical activity and sedentary behaviour from an Australian perspective. Students investigate factors that facilitate involvement in physical activity and consider barriers to participation for various population groups. Students create and implement a program that encourages compliance with the National Physical Activity Guidelines for a given age group

3. Decision making in sport
   This detailed study introduces students to an understanding of games and sport, including how they are categorised. Through a series of practical activities students analyse and interpret different strategies and tactics used within game situations, and approaches to coaching that develop a player’s ability to implement an appropriate strategic decision

Unit Outcomes
On completion of this unit the student should be able to:

- Demonstrate their knowledge of, and evaluate, the skills and behaviours of an exemplary coach, and explain the application of a range of skill learning principles used by a coach
- Collect and analyse data related to individual and population levels of participation in physical activity, and sedentary behaviour, and create and implement
- Explain the importance of interpreting game play and selecting appropriate tactics and strategies in sports
Unit 3
Physical Activity Participation and Physiological Performance

Unit Description
This unit introduces students to an understanding of physical activity and sedentary behaviour from a participatory and physiological perspective. Students apply various methods to assess physical activity and sedentary levels, and analyse the data in relation to adherence to the National Physical Activity Guidelines. Students study and apply the social-ecological model to identify a range of Australian strategies that are effective in promoting participation in some form of regular activity.

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.

Areas of Study
1. Monitoring and promotion of physical activity
   This area of study uses subjective and objective methods for assessing the student’s own and another cohort’s physical activity and sedentary levels. Students analyse the advantages and limitations of each of these methods to determine the most appropriate measure for a given setting. Students identify components of the social-ecological model to assist in the critique of government and non-government strategies aimed at increasing physical activity within the population.

2. Physiological responses to physical activity
   In this area of study students explore the various systems and mechanisms associated with the energy required for human movement. They consider the cardiovascular, respiratory and muscular systems and the roles of each in supplying oxygen and energy to the working muscles. They examine the way in which energy for activity is produced via the three energy systems and the associated fuels used for activities of varying intensity and duration. Students also consider the many contributing factors to fatigue as well as recovery strategies used to return to pre-exercise conditions. Through practical activities students explore the relationship between the energy systems during physical activity.

Unit Outcomes
On completion of this unit the student should be able to:

- Analyse individual and population levels of sedentary behaviour and participation in physical activity, and evaluate initiatives and strategies that promote adherence to the National Physical Activity Guidelines
- Use data collected in practical activities to analyse how the major body and energy systems work together to enable movements to occur, and explain the fatigue mechanisms and recovery strategies
Unit Description
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.

Areas of Study
1. Planning, implementing and evaluating a training program
   This area of study focuses on the components of fitness and assessment of fitness from a physiological perspective. Students consider the manner in which fitness can be improved by the application of appropriate training principles and methods. Students conduct an activity analysis of an elite athlete to determine the fitness requirements of a selected sport. They participate in fitness testing and an individual training program and evaluate this from a theoretical perspective

2. Performance enhancement and recovery practices
   This area of study explores nutritional, physiological and psychological strategies used to enhance performance. Students examine legal and illegal substances and methods of performance enhancement and develop an understanding of different anti-doping codes. Students consider strategies used to promote recovery, including nutritional, physiological and psychological practices

Unit Outcomes
On completion of this unit the student should be able to:
• Plan, implement and evaluate training programs to enhance specific fitness components
• Analyse and evaluate strategies designed to enhance performance or promote recovery
Unit Description
Ideas in physics are dynamic. As physicists explore concepts, theories evolve. Often this requires the detection, description and explanation of things that cannot be seen. In this unit students explore how physics explains phenomena, at various scales, which are not always visible to the unaided human eye. They examine some of the fundamental ideas and models used by physicists in an attempt to understand and explain the world. Students consider thermal concepts by investigating heat, probe common analogies used to explain electricity and consider the origins and formation of matter.

Areas of Study
1. How can thermal effects be explained?
   In this area of study students investigate the thermodynamic principles related to heating processes, including concepts of temperature, energy and work. Students examine the environmental impacts of Earth’s thermal systems and human activities with reference to the effects on surface materials, the emission of greenhouse gases and the contribution to the enhanced greenhouse effect. They analyse the strengths and limitations of the collection and interpretation of thermal data in order to consider debates related to climate science. In particular, the topics explored are:
   - Thermodynamics principles
   - Thermodynamics and climate science
   - Issues related to thermodynamics

2. How do electric circuits work?
   Modelling is a useful tool in developing concepts that explain physical phenomena that cannot be directly observed. In this area of study students develop conceptual models to analyse electrical phenomena and undertake practical investigations of circuit components. Concepts of electrical safety are developed through the study of safety mechanisms and the effect of current on humans. Students apply and critically assess mathematical models during experimental investigations of DC circuits. The areas focussed on are:
   - Concepts used to model electricity
   - Circuit electricity
   - Using electricity
   - Electrical safety

- What is matter and how is it formed?
  In this area of study students explore the nature of matter, and consider the origins of atoms, time and space. They examine the currently accepted theory of what constitutes the nucleus, the forces within the nucleus and how energy is derived from the nucleus. The topics studied are:
  - Origins of atoms
  - Particles in the nucleus
  - Energy from the atom

Unit Outcomes
On completion of this unit the student should be able to:
- Apply thermodynamic principles to analyse, interpret and explain changes in thermal energy in selected contexts, and describe the environmental impact of human activities with reference to thermal effects and climate science concepts
- Investigate and apply a basic DC circuit model to simple battery-operated devices and household electrical systems, apply mathematical models to analyse circuits, and describe the safe and effective use of electricity by individuals and the community
- Explain the origins of atoms, the nature of subatomic particles and how energy can be produced by atoms
Unit 2
What do experiments reveal about the physical world?

Unit Description
In this unit students explore the power of experiments in developing models and theories. They investigate a variety of phenomena by making their own observations and generating questions, which in turn lead to experiments. Students make direct observations of physics phenomena and examine the ways in which phenomena that may not be directly observable can be explored through indirect observations.

Areas of Study
1. How can motion be described and explained?
   In this area of study students observe motion and explore the effects of balanced and unbalanced forces on motion. They analyse motion using concepts of energy, including energy transfers and transformations, and apply mathematical models during experimental investigations of motion. Students model how the mass of finite objects can be considered to be at a point called the centre of mass. They describe and analyse graphically, numerically and algebraically the motion of an object, using specific physics terminology and conventions. The particular topics discussed are:
   - Concepts used to model motion
   - Forces and motion
   - Energy and motion

2. Focus Study
   Students choose one of 12 focus studies related to astrobiology, astrophysics, bioelectricity, biomechanics; electronics, flight, medical physics, nuclear energy, nuclear physics, optics, sound or sports science. The student will then carry out experiments and literature research in their chosen area in order to prepare them for the practical investigation for Area of Study 3.

3. Practical Investigation
   Students design and undertake an extended investigation related to their focus study in Area of Study 2. The investigation are summarised as a scientific poster.

Unit Outcomes
On completion of this unit the student should be able to:
- Investigate, analyse and mathematically model the motion of particles and bodies
- Carry out research into a chosen topic
- Design and undertake an investigation of a physics question related to the scientific inquiry processes of data collection and analysis, and draw conclusions based on evidence from collected data
Unit Description
This unit focuses on motion in one and two dimensions, electronics and photonics and a third area of study chosen from: Einstein’s relativity, investigating structures and materials, or further electronics.

Areas of Study
1. Motion in one and two dimensions:
   - Newton’s three laws of motion, the absolute nature of space and time
   - Apply Newton’s laws of motion to situations involving two or more forces
   - Analyse the ideal motion of projectiles near the Earth’s surface graphically and algebraically
   - Analyse relative speed of objects along a straight line in two dimensions
   - Analyse impulse and momentum transfers between objects moving along a straight line
   - Analyse transfers of energy between kinetic energy, potential energy and other forms of energy
   - Analyse planetary and satellite motion
   - Use uniform information sources to assess risk in the use of moving objects and equipment

2. Electronics and photonics:
   - Apply concepts of current, voltage power to operation of electronic circuits
   - Simplify circuits comprising parallel and series resistance and unloaded voltage dividers
   - Describe the effect of voltage characteristics of a single stage non transistor voltage
   - Analyse voltage characteristics of amplifiers including linear voltage gain and clipping
   - Use technical specifications related to voltage, current resistance, power illumination for electronic components
   - Analyse simple electronic transducer circuits
   - Compare and contrast bandwidth for information transfer in simple metal wire and optic fibres
   - Describe energy transfers and transformations in electrical – optical and optical – electrical conversion systems
   - Describe the transfer of energy in opto-electronic devices.
   - Use information sources to assess risk in the use of electrical, electronic and photonic equipment

3. Detailed study
   Choose one of the following
   - Einstein’s relativity
   - Investigating structures and materials
   - Further electronics
   - Photonics
   - Sound
   - Synchrotron

Unit Outcomes
On completion of this unit the student should be able to:
- Use the Newtonian model in one and two dimensions to describe and explain transport motion and related aspects of safety, and motion in space
- Compare and explain the operation of electronic and photonic devices and analyse their use in domestic and industrial systems
Unit Description
This unit covers the complex interactions of light and matter. A field model of electromagnetism is applied to the generation, distribution and use of electric power.

Areas of Study
1. Electric power
   - Apply a field model to magnetic phenomena
   - Apply a field model to define magnetic flux
   - Explain the generation of voltage
   - Quantify magnetic forces on current carrying wires
   - Describe the operation of simple DC motors
   - Describe the generation of voltage in generators and alternators
   - Use $rms$ values for a sinusoidal AC voltage
   - Compare sinusoidal AC voltage produced as a result of uniform rotation of a loop in a constant magnetic flux
   - Explain transformer action
   - Model mathematically transmission losses
   - Use information sources to assess risk in the use of electricity

2. Interactions of light and matter
   - Explain the results of Young’s double slit experiment
   - Interpret the pattern produced by light when it passes through a gap
   - Interpret the photoelectric effect as evidence for the particle-like nature of light
   - Interpret electronic diffraction patterns as evidence for the wave-like nature of matter
   - Distinguish between the momentum of photons and the momentum as applied to the wave-like nature of matter
   - Interpret atomic absorption and emission spectra in terms of quantized energy level model of the atom
   - Interpret the emission and absorption spectra of hydrogen in terms of the model in which the electrons are found
   - Use information sources to assess risk in the use of light sources, lasers and related equipment

Unit Outcomes
On completion of this unit the student should be able to:
- To use wave and photon models to explain interactions of light and matter and the quantized energy levels of atoms
- To explain the operation of electric motors, generators and alternators and the generation, transmission, distribution and use of electric power
- In the detailed studies students look at aspects of synchrotron, photonics or sound and its applications
Unit Description
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. Students use Newton’s laws to investigate motion in one and two dimensions, and are introduced to Einstein’s theories to explain the motion of very fast objects. They consider how developing technologies can challenge existing explanations of the physical world, requiring a review of conceptual models and theories. Students design and undertake investigations involving at least two continuous independent variables.

Areas of Study
1. How do things move without contact?
   In this area of study students examine the similarities and differences between three fields: gravitational, electric and magnetic. Field models are used to explain the motion of objects when there is no apparent contact. Students explore how positions in fields determine the potential energy of an object and the force on an object. They investigate how concepts related to field models can be applied to construct motors, maintain satellite orbits and to accelerate particles. The topics discussed are:
   • Fields and interactions
   • Effects of fields
   • Application of field concepts

2. How are fields used to move electrical energy?
The production, distribution and use of electricity has had a major impact on human lifestyles. In this area of study students use empirical evidence and models of electric, magnetic and electromagnetic effects to explain how electricity is produced and delivered to homes. They explore magnetic fields and the transformer as critical to the performance of electrical distribution systems. The students will focus on:
   • Generation of electricity
   • Transmission of electricity

3. How fast can things go?
   In this area of study students use Newton’s laws of motion to analyse relative motion, circular motion and projectile motion. Newton’s laws of motion give important insights into a range of motion both on Earth and beyond. At very high speeds, however, these laws are insufficient to model motion and Einstein’s theory of special relativity provides a better model. Students compare Newton’s and Einstein’s explanations of motion and evaluate the circumstances in which they can be applied. They explore the relationships between force, energy and mass
   The topics explored are:
   • Newton’s laws of motion
   • Einstein’s theory of relativity
   • Relationships between force, energy and mass

Unit Outcomes
On completion of this unit the student should be able to:
• Analyse gravitational, electric and magnetic fields, and use these to explain the operation of motors and particle accelerators and the orbits of satellites
• Analyse and evaluate an electricity generation and distribution system
• Investigate motion and related energy transformations experimentally, analyse motion using Newton’s laws of motion in one and two dimensions
Unit 4 2017
Unit 4: How can two contradictory models explain both light and matter?

Unit Description
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 wave model is also used to explain the behaviour of matter which enables students to consider the relationship between light and matter. Students learn to think beyond the concepts experienced in everyday life to study the physical world from a new perspective. Students design and undertake investigations involving at least two continuous independent variables.

Areas of Study
1. How can waves explain the behaviour of light?
   In this area of study students use evidence from experiments to explore wave concepts in a variety of applications. Wave theory has been used to describe transfers of energy, and is important in explaining phenomena including reflection, refraction, interference and polarisation. Do waves need a medium in order to propagate and, if so, what is the medium? Students investigate the properties of mechanical waves and examine the evidence suggesting that light is a wave. They apply quantitative models to explore how light changes direction, including reflection, refraction, colour dispersion and polarisation.
   The topics focussed on are:
   • Properties of mechanical waves
   • Light as a wave

2. How are light and matter similar?
   In this area of study students explore the design of major experiments that have led to the development of theories to describe the most fundamental aspects of the physical world – light and matter. The students will explore the following topics:
   • Behaviour of light
   • Matter as particles or waves
   • Similarities between light and matter
   • Production of light from matter

3. Practical investigation
   A student-designed practical investigation related to waves, fields or motion is undertaken either in Unit 3 or Unit 4, or across both Units 3 and 4. The investigation relates to knowledge and skills developed across Units 3 and 4 and is undertaken by the student through practical work

Unit Outcomes
On completion of this unit the student should be able to:
• Apply wave concepts to analyse, interpret and explain the behaviour of light
• Provide evidence for the nature of light and matter, and analyse the data from experiments that supports this evidence
• Design and undertake a practical investigation related to waves or fields or motion, and present methodologies, findings and conclusions in a scientific poster
Psychology

Unit 1
How are behaviour and mental processes shaped?

Unit Description
Human development involves changes in thoughts, feelings and behaviours. In this unit students investigate the structure and functioning of the human brain and the role it plays in the overall functioning of the human nervous system. Students explore brain plasticity and the influence that brain damage may have on a person’s psychological functioning. They consider the complex nature of psychological development, including situations where psychological development may not occur as expected. Students examine the contribution that classical and contemporary studies have made to an understanding of the human brain and its functions, and to the development of different psychological models and theories used to predict and explain the development of thoughts, feelings and behaviours.

Areas of Study

1. How does the brain function?
   In this area of study students examine how our understanding of brain structure and function has changed over time and how the brain enables us to interact with the external world around us. They analyse the roles of specific areas of the brain and the interactions between different areas of the brain that enable complex cognitive tasks to be performed. Students explore how brain plasticity and brain damage can affect a person’s functioning. The particular areas focussed on are:
   • Role of the brain in mental processes and behaviour
   • Brain plasticity and brain damage

2: What influences psychological development?
   The psychological development of an individual involves complex interactions between biological, psychological and social factors. In this area of study students explore how these factors influence different aspects of a person’s psychological development. They consider the interactive nature of hereditary and environmental factors and investigate specific factors that may lead to development of typical or atypical psychological development in individuals, including a person’s emotional, cognitive and social development and the development of psychological disorders. The students will explore:
   • The complexity of psychological development
   • Atypical psychological development

3. Student-directed research investigation
   In this area of study students apply and extend their knowledge and skills developed in Areas of Study 1 and/or 2 to investigate a question related to brain function and/or psychological development. Students analyse the scientific evidence that underpins the research in response to a question of interest. They then communicate the findings of their research investigation and explain the psychological concepts, outline contemporary research and present conclusions based on the evidence

Unit Outcomes
On completion of this unit the student should be able to:

• Describe how understanding of brain structure and function has changed over time, explain how different areas of the brain coordinate different functions, and explain how brain plasticity and brain damage can change psychological functioning

• Identify the varying influences of nature and nurture on a person’s psychological development, and explain different factors that may lead to typical or atypical psychological development

• Investigate and communicate a substantiated response to a question related to brain function and/or development, including reference to at least two contemporary psychological studies and/or research techniques
Unit 2
How do external factors influence behaviour and mental processes?

Unit Description
A person’s thoughts, feelings and behaviours are influenced by a variety of biological, psychological and social factors. In this unit students investigate how perception of stimuli enables a person to interact with the world around them and how their perception of stimuli can be distorted. They evaluate the role social cognition plays in a person’s attitudes, perception of themselves and relationships with others. Students explore a variety of factors and contexts that can influence the behaviour of an individual and groups. They examine the contribution that classical and contemporary research has made to the understanding of human perception and why individuals and groups behave in specific ways.

Areas of Study
1. What influences a person’s perception of the world?
   Human perception of internal and external stimuli is influenced by a variety of biological, psychological and social factors. In this area of study students explore two aspects of human perception – vision and taste – and analyse the relationship between sensation and perception of stimuli. They consider how biological, psychological and social factors can influence a person’s perception of visual and taste stimuli, and explore circumstances where perceptual distortions of vision and taste may occur. The particular areas studied are:
   - Sensation and perception
   - Distortions of perception

2. How are people influenced to behave in particular ways?
   A person’s social cognition and behaviour influence the way they view themselves and the way they relate to others. In this area of study students explore the interplay of biological, psychological and social factors that shape the behaviour of individuals and groups. They consider how these factors can be used to explain the cause and dynamics of particular individual and group behaviours, including attitude formation, prejudice, discrimination, helping behaviour and bullying. Students examine the findings of classical and contemporary research as a way of theorising and explaining individual and group behaviour. The students will explore:
   - Social cognition
   - Social influences on behaviour

3. Student-directed practical investigation
   In this area of study students design and conduct a practical investigation related to external influences on behaviour. The investigation requires the student to develop a question, plan a course of action to answer the question, undertake an investigation to collect the appropriate primary qualitative and/or quantitative data, organise and interpret the data and reach a conclusion in response to the question. The investigation relates to knowledge and skills developed in Areas of Study 1 and/or 2 and is undertaken by the student using either quantitative or qualitative methods, including experiments, surveys, questionnaires, observational studies and/or rating scales

Unit Outcomes
On completion of this unit the student should be able to:
- Compare the sensations and perceptions of vision and taste, and analyse factors that may lead to the occurrence of perceptual distortions
- Identify factors that influence individuals to behave in specific ways, and analyse ways in which others can influence individuals to behave differently
- Design and undertake a practical investigation related to external influences on behaviour, and draw conclusions based on evidence from collected data
Unit 3 2016
The Conscious Self

Unit Description
This unit focuses on the study of the relationship between the brain and the mind through examining the basis of consciousness, behaviour, cognition and memory.

Areas of Study
1. Mind, Brain and Body
   Why do I think and feel the way I do? How does my brain work? What is the relationship between my brain and my mind? What happens when I sleep?

Key knowledge:
- concepts of normal waking consciousness and altered states of consciousness, including daydreaming, meditative and alcohol-induced, in terms of levels of awareness, content limitations, controlled and automatic processes, perceptual and cognitive distortions, emotional awareness, self-control and time orientation
- sleep as an altered state of consciousness: purpose, characteristics and patterns of the stages of sleep including rapid eye movement (REM) and the non-rapid eye movement (NREM) stages of sleep
- methods used to study the level of alertness in normal waking consciousness and the stages of sleep:
  - measurement of physiological responses including electroencephalograph (EEG), electrooculargraph (EOG), heart rate, body temperature and galvanic skin response (GSR)
  - the use of sleep laboratories, video monitoring and self reports
- the effects of total and partial sleep deprivation:
  - loss of REM and NREM sleep
  - sleep recovery patterns including amount of sleep required, REM rebound and microsleeps
  - sleep-wake cycle shifts during adolescence compared with child and adult sleep including delayed onset of sleep and need for sleep
- the interaction between cognitive processes of the brain and its structure including:
  - roles of the central nervous system, peripheral nervous system (somatic and autonomic), and autonomic nervous system (sympathetic and parasympathetic)
  - roles of the four lobes of the cerebral cortex in the control of motor, somatosensory, visual and auditory processing in humans; primary cortex and association areas
  - hemispheric specialisation: the cognitive and behavioural functions of the right and left hemispheres of the cerebral cortex, non-verbal versus verbal and analytical functions
- contribution of studies to the investigation of cognitive processes of the brain and implications for the understanding of consciousness including:
  - studies of aphasia including Broca’s aphasia and Wernicke’s aphasia
  - spatial neglect caused by stroke or brain injury
  - split-brain studies including the work of Roger Sperry and Michael Gazzaniga
- research methods and ethical principles associated with the study of the brain and states of consciousness, as outlined in the introduction to the unit
2. Memory
Why do I remember some things and forget others? How are memories formed? Can I improve my memory? These questions highlight the characteristics of memory as a cognitive process.

Key knowledge:

- mechanism of memory formation:
  - role of the neuron in memory formation informed by the work of E. Richard Kandel
  - roles of the hippocampus and temporal lobe and anigdata
  - consolidation theory
  - memory decline over the lifespan
  - amnesia resulting from brain trauma and neurodegenerative diseases including dementia and Alzheimer’s disease
- comparison of models for explaining human memory:
  - Atkinson-Shiffrin’s multi-store model of memory including maintenance and elaborative rehearsal, serial position effect and chunking
  - Alan Baddeley and Graham Hitch’s model of working memory: central executive, phonological loop, visuo-spatial sketchpad, episodic buffer
  - levels of processing as informed by Fergus Craik and Robert Lockhart
  - organisation of long-term memory including declarative and episodic memory, and semantic network theory
- strengths and limitations of psychological theories of forgetting:
  - forgetting curve as informed by the work of Hermann Ebbinghaus
  - retrieval failure theory including tip-of-the-tongue phenomenon
  - interference theory
  - motivated forgetting as informed by the work of Sigmund Freud including repression and suppression
  - decay theory
- manipulation and improvement of memory:
  - measures of retention including the relative sensitivity of recall, recognition and relearning
  - use of context dependent cues and state dependent cues
  - mnemonic devices including acronyms, acrostics, narrative chaining
  - effect of misleading questions on eye-witness testimonies including the reconstructive nature of memory informed by the work of Elizabeth Loftus
- research methods and ethical principles associated with the study of memory, as outlined in the introduction to the unit

Unit Outcomes
On completion of this unit the student should be able to:

- Explain the relationship between the brain, states of consciousness including sleep, and behaviour, and describe the contribution of selected studies and brain research methods
- Compare theories that explain the neural basis of memory and factors that affect its retention, and evaluate the effectiveness of techniques for improving and manipulating memory
Psychology

Unit 4 2016
Brain, Behaviour and Experience

Unit Description
This unit focuses on the interrelationship between learning, the brain and its response to experiences, and behaviour. The overall quality of functioning of the brain depends on experience, and its plasticity means that different kinds of experience change and configure the brain in different ways. Students investigate learning as a mental process that leads to the acquisition of knowledge, development of new capacities and changed behaviours. Understanding the mechanisms of learning, the cognitive processes that affect readiness for learning, and how people learn informs both personal and social issues.

Areas of Study
1. Learning
   How do we learn? Why do some people learn faster than others? How important are role models in shaping behaviour?

Key knowledge:
- behaviours not dependent on learning including reflex action, fixed action patterns and behaviours due to physical growth and development (maturation)
- neural mechanisms of learning:
  ~ developmental plasticity and adaptive plasticity of the brain: changes to the brain in response to learning and experience; timing of experiences
- applications of, and comparisons of, learning theories:
  ~ classical conditioning as informed by Ivan Pavlov: roles of neutral, unconditioned, conditioned stimuli; unconditioned and conditioned responses
  ~ applications of classical conditioning: graduated exposure, aversion therapy, flooding
  ~ three-phase model of operant conditioning as informed by B.F. Skinner: positive and negative reinforcement, response cost, punishment and schedules of reinforcement
  ~ applications of operant conditioning: shaping, token economies
  ~ comparisons of classical and operant conditioning in terms of the processes of acquisition, extinction, stimulus generalisation, stimulus discrimination, spontaneous recovery, role of learner, timing of stimulus and response, and nature of response (reflexive/voluntary)
  ~ trial-and-error learning
  ~ observational learning (modelling) processes in terms of the role of attention, retention, reproduction, motivation, reinforcement as informed by Albert Bandura’s social learning theory
- the extent to which ethical principles were applied to classic research investigations into learning including John Watson’s ‘Little Albert’ experiment
- research methods and ethical principles associated with the study of learning, as outlined in the introduction to the unit
2. Mental health
   What does mental health mean? How can ‘normality’ be defined? Is feeling stressed ‘normal’? What is the relationship between mental health and illness? How can mental wellbeing be enhanced?

Key knowledge:
- concepts of normality and differentiation of mental health from mental illness
- systems of classification of mental conditions and disorders: underlying principles of classification; strengths and limitations of discrete categorical (DSM-IV and ICD-10) and dimensional (graded and transitional) approaches to classification of mental disorders
- use of a biopsychosocial framework (the interaction and integration of biological, psychological and social factors) as an approach to considering physical and mental health
- application of a biopsychosocial framework to understanding the relationship between stress and physical and mental wellbeing:
  ~ physiological and psychological characteristics of responses to stress including fight-flight response, eustress and distress;
  ~ psychological determinants of the stress response; strengths and limitations of Richard Lazarus and Susan Folkman’s Transactional Model of Stress and Coping
  ~ social, cultural and environmental factors that exacerbate and alleviate the stress response
  ~ allostatics (stability through change brought about by the brain’s regulation of the body’s response to stress) as a model that integrates biological, psychological and social factors that explain an individual’s response to stress
  ~ strategies for coping with stress including biofeedback, meditation/relaxation, physical exercise, social support
- application of a biopsychosocial framework to understanding schizophrenia and its management:
  ~ biological contributing factors: genetic predisposition; drug-induced onset; changes in brain activity; the use of medication that blocks dopamine to treat psychosis
  ~ psychological contributing factors: impaired mechanisms for reasoning and memory; the use of psychotherapies in management including cognitive behavioural and remediation therapies, stress management
  ~ socio-cultural contributing factors: social disadvantage, trauma and psycho-social stress as risk factors; psychoeducation, supportive social (including family) environments, removal of social stigma
  ~ the interaction between biological, psychological and socio-cultural factors which contribute to an understanding of the disorder and its management
  ~ research methods and ethical principles associated with the study of mental health, as outlined in the introduction to the unit

Unit Outcomes
On completion of this unit the student should be able to:
- Explain the neural basis of learning, and compare and contrast different theories of learning and their applications
- Differentiate between mental health and mental illness, and use a biopsychosocial framework to explain the causes and management of stress, simple phobia and a selected mental disorder
Psychology

Unit 3 2017
How does experience affect behaviour and mental processes?

Unit Description
The nervous system influences behaviour and the way people experience the world. In this unit students examine both macro-level and micro-level functioning of the nervous system to explain how the human nervous system enables a person to interact with the world around them. They explore how stress may affect a person’s psychological functioning and consider the causes and management of stress. Students investigate how mechanisms of memory and learning lead to the acquisition of knowledge, the development of new capacities and changed behaviours. They consider the limitations and fallibility of memory and how memory can be improved. Students examine the contribution that classical and contemporary research has made to the understanding of the structure and function of the nervous system, and to the understanding of biological, psychological and social factors that influence learning and memory.

Areas of Study
1. How does the nervous system enable psychological functioning?
   In this area of study, students explore the role of different branches of the nervous system in enabling a person to integrate, coordinate and respond to internal and external sensory stimuli. They explore the specialised structures and functioning of neurons that allow the nervous system to transmit neural information. Students evaluate how biological, psychological and social factors can influence a person’s nervous system functioning. In particular, they consider the ways in which stress can affect the mind and body, the role that the nervous system plays in these processes and how stress can be managed. The particular topics explored are:
   - Nervous system functioning
   - Stress as an example of a psychobiological process

2. How do people learn and remember?
   Memory and learning are core components of human identity: they connect past experiences to the present and shape futures by enabling adaptation to daily changes in the environment. In this area of study students study the neural basis of memory and learning and examine factors that influence the learning of new behaviours and the storage and retention of information in memory. They consider the influence of biological, psychological and social factors on the fallibility of memory. The students will explore:
   - Neural basis of learning and memory
   - Models to explain learning
   - Process of memory
   - Reliability of memory

Unit Outcomes
On completion of this unit the student should be able to:
- Explain how the structure and function of the human nervous system enables a person to interact with the external world and analyse the different ways in which stress can affect nervous system functioning
- Apply biological and psychological explanations for how new information can be learnt and stored in memory, and provide biological, psychological and social explanations of a person’s inability to remember information
Psychology

Unit 4 2017
How is wellbeing developed and maintained?

Unit Description
Consciousness and mental health are two of many psychological constructs that can be explored by studying the relationship between the mind, brain and behaviour. In this unit students examine the nature of consciousness and how changes in levels of consciousness can affect mental processes and behaviour. They consider the role of sleep and the impact that sleep disturbances may have on a person’s functioning. Students explore the concept of a mental health continuum and apply a biopsychosocial approach, as a scientific model, to analyse mental health and disorder. They use specific phobia to illustrate how the development and management of a mental disorder can be considered as an interaction between biological, psychological and social factors. Students examine the contribution that classical and contemporary research has made to the understanding of consciousness, including sleep, and the development of an individual’s mental functioning and wellbeing.

Areas of Study
1. How do levels of consciousness affect mental processes and behaviour?
   Differences in levels of awareness of sensations, thoughts and surroundings influence individuals’ interactions with their environment and with other people. In this area of study students focus on states of consciousness and the relationship between consciousness and thoughts, feelings and behaviours. They explore the different ways in which consciousness can be studied from physiological and psychological perspectives and how states of consciousness can be altered. Students consider the nature and importance of sleep and apply biological, psychological and social factors to analyse the effects of sleep disturbances on psychological functioning, including mood, cognition and behaviour.
   The areas explored are:
   • Nature of consciousness
   • Importance of sleep
   • Effects of sleep disturbances and possible treatments

2: What influences mental wellbeing?
In this area of study, students examine what it means to be mentally healthy. They explore the concept of a mental health continuum and factors that explain how location on the continuum for an individual may vary over time. Students apply a biopsychosocial approach to analyse mental health and mental disorder, and evaluate the roles of predisposing, precipitating, perpetuating and protective factors in contributing to a person’s mental state. Specific phobia is used to illustrate how a biopsychosocial approach can be used to explain how biological, psychological and social factors are involved in the development and management of a mental disorder. Students explore the concepts of resilience and coping and investigate the psychological basis of strategies that contribute to mental wellbeing. The students will study:
   • Defining mental health
   • Factors that contribute to the development and progression of mental health disorders
   • Application of a biopsychosocial approach, as a scientific model, to explain specific phobia
   • Maintenance of mental health

3. Practical investigation
The investigation requires the student to identify an aim, develop a question, formulate a research hypothesis including operationalised variables and plan a course of action to answer the question and that takes into account safety and ethical guidelines. Students then undertake an experiment that involves the collection of primary qualitative and/or quantitative data, analyse and evaluate the data, identify limitations of data and methods, link experimental results to science ideas, reach a conclusion in response to the question and suggest further investigations which may be undertaken. Results are communicated in a scientific poster format. The investigation can relate to a topic discussed in either Unit 3 or Unit 4
Unit Outcomes
On completion of this unit the student should be able to:

- Explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person’s functioning
- Explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing
- Design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster
Unit Description
This unit focuses on using sources of inspiration and individual ideas as the basis for developing artworks and exploring a wide range of materials and techniques as tools for communicating ideas, observations and experiences through art making.

Students also explore and research the ways in which artists from different times and cultures have interpreted and expressed ideas, sourced inspiration and used materials and techniques in the production of artworks.

Areas of Study
1. Developing art ideas
   This area of study focuses on the development of individual ideas and the identification of sources of inspiration to be used as starting points for making art. Students explore artmaking practices that use a variety of methods to communicate and develop ideas. Students explore different sources as starting points for the making of artworks. These may include reflections on personal experiences, ideas and issues as well as the observations of people, societies, natural and constructed objects and environments. Various methods of recording sources of inspiration are identified and developed into a visual language through a variety of ways. Students consolidate their experience through the development of their individual ideas and the artwork they produce.

2. Materials and techniques
   This area of study focuses on the use of materials and techniques in the production of artworks. Students explore a range of materials and techniques. They develop skills and learn to safely manipulate particular characteristics and properties of materials. They investigate the way various visual effects and aesthetic qualities can be achieved. Students convey individual ideas through the use of different materials and techniques. To consolidate the knowledge gained, students undertake a process of reflection and evaluation in written and visual forms of the work produced.

3. Interpretation of art ideas and use of materials and techniques
   This area of study focuses on the way artists from different times and cultures have interpreted ideas and sources of inspiration and used materials and techniques in the production of artworks. The work of artists from different times and cultures is studied in order to gain a broader understanding of how artworks are conceived and produced. Students begin to compare and contrast the way artists have used similar and different materials and techniques and interpreted ideas and sources of inspiration in producing artworks. Students research a range of resources to support the identification and discussion of materials and techniques appropriate to artists’ work, becoming familiar with art language and with some of the terminology used in art analysis.

Unit Outcomes
On completion of this unit the student should be able to:
- Source inspiration, identify individual ideas and use a variety of methods to translate these into visual language.
- Explore and use a variety of materials and techniques to support and record the development of individual ideas to produce artworks.
- Discuss how artists from different times and cultures have interpreted sources of inspiration and used materials and techniques in the production of artworks.
Unit Description
This unit focuses on students establishing and using a design process to produce artworks. The design process includes the formulation and use of an individual approach to locating sources of inspiration, experimentation with materials and techniques, and the development of aesthetic qualities, directions and solutions prior to the production of artworks. Students also develop skills in the visual analysis of artworks. Artworks made by artists from different times and cultures are analysed to understand the artists’ ideas and how they have created aesthetic qualities and identifiable styles.

Areas of Study
1. Design exploration
   This area of study focuses on developing artworks through an individual design process based on visual research and inquiry. In developing an individual design process, students learn to explore ideas and sources of inspiration. Students respond to stimulus to generate ideas related to context and items; for example, the environment, personal experiences and human emotion. They experiment with materials and techniques, practise skills and use art elements including line, tone, shape, colour, texture and other elements such as sound and light, to produce particular aesthetic qualities. Students learn to generate a range of directions, and analyse and evaluate these before the production of artworks.

2. Ideas and styles in artworks
   This area of study focuses on an analysis of artworks. Artworks by artists and/or groups of artists from different times and cultures are analysed in order to understand how art elements and principles are used to communicate artists’ ideas, and create aesthetic qualities and identifiable styles. These art elements include line, tone, shape, colour, texture and may include other elements such as sound and light. Visual principles may include repetition, scale and space. The use of signs, symbols and images for their implied meaning are also identified and discussed. In analysing artworks, students further develop appropriate art terminology and skills in researching and using a variety of references.

Unit Outcomes
On completion of this unit the student should be able to:
- Develop an individual design process, including visual research and inquiry, in order to produce a variety of design explorations to create a number of artworks.
- Analyse and discuss the ways in which artists from different times and cultures have created aesthetic qualities in artworks, communicated ideas and developed styles.
**Unit 3**  
**Studio Production and Professional Practices**

**Unit Description**  
This unit focuses on the implementation of an individual design process leading to the production of a range of potential directions and solutions. Students develop and use an exploration proposal to define an area of creative exploration, then apply a design process to explore and develop their aims and ideas.

The design process is individually determined by the student. It record trialling, experimenting, analysing and evaluating how successfully they communicate their aims and ideas. From this process students can develop directions for the development of finished artworks in Unit 4.

Students also investigate and analyse the response of artists to a wide range of stimuli, and examine their use of materials and techniques. They explore various artist's professional art practices and identify the development of styles in artworks. Students also consider the issues that may arise from the use of other artist's work in the making of new artworks. They are also expected to visit at least two different exhibition spaces in their current year of study.

**Areas of Study**

1. **Exploration Proposal**
   - Development of an exploration proposal that creates a framework for the individual design process.

2. **Design Process**
   - This focuses on an individual design process outlines ion the exploration proposal.
   - Throughout the design process, the student investigates the focus, subject matter, sources of inspiration and art forms through the exploration and development of ideas, materials, techniques and aesthetic qualities.
   - Students explore, clarify and consolidate ideas in order to develop potential directions.
   - They further develop skills of reflection, analysis and evaluation of developmental work, through detailed annotation.
   - Students progressively refine their ideas, techniques, materials and processes.
   - They use a visual diary that demonstrates in both written and visual form the development of the potential directions throughout the design process.

3. **Professional art practices and styles**
   - Students investigate the ways in which artists have interpreted subject matter, influences, cultural contexts, and communicating ideas and meanings in making artworks.
   - They identify and review the issues, legal obligations, and ethical considerations that may arise from the use of other artist's in the making of new artwork, including appropriation and originality, copyright law, licensing agreements and the moral rights of artists.
   - Students are expected to study at least two artists.

**Unit Outcomes**

On completion of this unit the student should be able to:

- Prepare an exploration proposal that formulates the content and parameters of an individual design process, and that includes a plan of how that proposal will be undertaken
- Present an individual design process that produces a range of potential directions, which reflects the concepts and ideas documented in the exploration proposal
- Discuss art practices in relation to particular artworks of at least two artists and analyse ways in which artists develop their styles
Studio Arts

Unit 4
Studio Production and Industry

This unit focuses on the production of a cohesive folio of finished artworks, using selected potential directions developed in Unit 3. These artworks should reflect the skilful application of materials and techniques, and the resolution of ideas and aesthetic qualities.

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 preparation, presentation and conservation of artworks.

Area of Study

1. Folio of artworks
   - Production of a cohesive folio of finished artworks developed from the selected potential directions from unit 3
   - Folio demonstrates identified relationships between the artworks that are interpreted through aesthetics, themes, concepts and/or materials and techniques
   - Artworks are presented in a manner appropriate to the selected art forms, and reflect an understanding of the art forms and related materials and techniques
   - Materials and techniques are skilfully applied, and ideas, techniques and aesthetic qualities are resolved
   - Aim is to realise student’s aims and ideas in the final artworks
   - Folio consists of no fewer than two substantial

2. Focus, reflection and evaluation
   - Students reflect on their folio and produce an evaluation of the finished artworks, through visual and written documentation.
   - Students examine and reflect on the communication of ideas, the use of material and techniques, the resolution of aesthetics and the relationships that have been formed in the cohesive folio

3. Art industry contexts
   - The analysis of requirements and condition of environments where artworks are presented
   - Examination of a variety of exhibition spaces and review the methods and considerations involved in the preparation, presentation and conservation of artworks
   - Development of awareness and understanding of the exhibition of artworks, focusing on the production, presentation, promotion and marketing of art
   - The recognition and features of a variety of different kinds of art spaces and galleries

Unit Outcomes

On completion of this unit the student should be able to:
   - Present a cohesive folio of finished artworks, based on selected potential directions from unit 3
   - Provide visual and written documentation that identifies the folio focus and evaluates the extent to which the finished artworks reflect the selected potential directions and effectively demonstrate a cohesive relationship between the works
   - Examine and explain the preparation and presentation of artworks and discuss the various roles, processes and methods involved in the exhibition of artworks
Unit Description
In this unit students develop an interpretation of a play script through the stages of the theatrical production process: planning, development and presentation. Students specialise in two areas of stagecraft, working collaboratively in order to realise the production of a play script. They use knowledge they develop from this experience to analyse the ways stagecraft can be used to interpret previously unseen play script excerpts.

Areas of Study
1. Production process
2. Theatrical interpretation
3. Production analysis

Key Skills and Knowledge:
- Demonstrate an understanding of the stages of a production process
- Contribute effectively to the development of an imaginative interpretation of a play script through involvement in each stage of the production process, culminating in a performance to an audience
- Describe ways in which stagecraft can be used imaginatively to interpret excerpts from a play script
- Justify how the interpretation could be realised through the application of stagecraft
- Analyse ways in which the contexts of a written play script were interpreted through performance to an audience
- Evaluate the interpretation of the written play script for performance

Unit Outcomes
On completion of this unit the student should be able to:
- Apply stagecraft to interpret a play script for performance to an audience
- Document an interpretation of excerpts from a play script and explain how stagecraft can be applied in the interpretation
- Analyse and evaluate the interpretation of a written play script in production to an audience
Unit 4
Performance Interpretation

Unit Description
In this unit students study a scene and associated monologue from the Theatre Studies Stagecraft Examination Specifications published annually by the Victorian Curriculum and Assessment Authority, and develop a theatrical treatment that includes the creation of a character by an actor, stagecraft possibilities, and appropriate research. Students interpret a monologue from within a specified scene using selected areas of stagecraft to realise their interpretation.

Areas of Study
1. Monologue interpretation
2. Scene interpretation
3. Performance analysis

Key Skills and Knowledge
- analyse the character/s in the production including status, motivation and characteristics
- analyse and evaluate interpretation by actor/s of a play script in performance, including the acting skills used by actor/s to realise character/s, the use of focus and the acting space and the interrelationships between acting, direction and design
- apply stagecraft
- apply theatrical styles
- make decisions to enhance interpretation
- interpret the contexts of the monologue
- convey intended meanings of the monologue

Unit Outcomes
On completion of this unit the student should be able to:
- Interpret a monologue from a play script and justify their interpretive decisions.
- Develop a theatrical treatment that presents an interpretation of a monologue and its prescribed scene.
- Analyse and evaluate acting in a production.
Unit 1
Introduction to Visual Communication Design

Unit Description
This unit focuses on using visual language to communicate messages, ideas and concepts. This involves acquiring and applying design thinking skills as well as drawing skills to make messages, ideas and concepts visible and tangible. Students practise their ability to draw what they observe and they use visualisation drawing methods to explore their own ideas and concepts. Students develop an understanding of the importance of presentation drawings to clearly communicate their final visual communications. Through experimentation and through exploration of the relationship between design elements and design principles, students develop an understanding of how design elements and principles affect the visual message and the way information and ideas are read and perceived. Students review the contextual background of visual communication through an investigation of design styles. This research introduces students to the broader context of the place and purpose of design.

Areas of Study
1. Drawing as a means of communication
   This area of study introduces the skill set that underpins the discrete design process stages of generating ideas, developing concepts and refining drawings. It focuses on the development of visual language and design thinking skills. Students use observational, visualisation and presentation drawing as the means by which ideas and concepts are communicated. Through observational drawing students consider reasons for the choices designers make regarding the aesthetics, appearance and function of objects/structures. Students investigate ways of representing form and surface textures, and apply different materials and media to render drawings. Students use drawing methods such as paraline and perspective to create three-dimensional freehand drawings that maintain proportion. Students use these observational drawings as a starting point for visualising new design possibilities. They creatively use a range of media to generate drawings that represent alternative visualisations. Freehand visualisation drawing methods are used to make thinking visible and to communicate ideas. Drawing is also used as a means of presentation. Students learn how to produce resolved presentation drawings which are more refined and demonstrate an understanding of the application of selected media and materials.

2. Design elements and design principles
   This area of study focuses on design elements and design principles. Students experiment with the elements and principles when using freehand and image-generation methods such as Photoshop and Illustrator to visualise ideas and concepts. They investigate purposes for creating visual communications and consider how the relationship between design elements and design principles contributes to achieving these purposes. Through addressing a stated purpose, students are introduced to a skill set that underpins the design process stages of generation of ideas and development of concepts.

3. Visual communication design in context
   Visual communication design draws on a broad range of sources to support creativity and innovation. Historical and cultural practices and the values and interests of different societies influence innovation in visual communication designs. Through a case study approach, students explore how visual communications have been influenced by social and cultural factors and past and contemporary visual communication practices. Students consider the works of key designers in terms of visual language and the use of materials, methods, media, design elements, design principles and presentation formats. This area of study introduces students to the design process stage of research.

Unit Outcomes
On completion of this unit the student should be able to:
- Create drawings for different purposes using a range of drawing methods, media and materials
- Select and apply design elements and design principles to create visual communications that satisfy stated purposes
- Describe how a visual communication has been influenced by past and contemporary practices, and by social and cultural factors.
Unit 2
Applications of Visual Communication Design

Unit Description
This unit focuses on the application of visual communication design knowledge, design thinking skills and drawing methods to create visual communications to meet specific purposes in designated design fields. Students use presentation drawing methods that incorporate the use of technical drawing conventions to communicate information and ideas associated with the environmental or industrial fields of design. They investigate how typography and imagery are used in visual communication design. They apply design thinking skills when exploring ways in which images and type can be manipulated to communicate ideas and concepts in different ways in the communication design field. Students develop an understanding of the design process as a means of organising their thinking about approaches to solving design problems and presenting ideas. In response to a brief, students engage in the stages of research, generation of ideas and development of concepts to create visual communications.

Areas of Study
1. Technical drawing in context
   This area of study focuses on the acquisition and application of presentation drawing skills that incorporate the use of technical drawing conventions. These drawings present information and ideas associated with a specific design field. One of the following design fields is selected for detailed study:
   - environmental design or
   - industrial/communication design

   Within the environmental design field, students can focus on a specific area such as architectural, interior or landscape design. Within the industrial design field, students can focus on a specific area such as appliances/homewares, packaging, tools and transport. In the selected design field students investigate ways in which information and ideas can be communicated to a client and draw on these understandings when creating presentation drawings. They acquire knowledge and skills related to technical drawing conventions and apply these when representing forms using two- and three-dimensional presentation drawings appropriate to the selected field. Students use manual and/or digital methods to create the drawings.

2. Type and imagery
   Increasing advancements in the digital communication of information and their popularity has led to a greater need for understanding the meaning and function of typography in visual language. In this area of study students develop knowledge and skills in manipulating type and images when communicating ideas and concepts in the design field of communication. Within the field of communication design, students can focus on areas such as graphic design, packaging/surface design and brand identity. They consider historical and contemporary factors that have influenced the style and layout of print and screen-based presentation formats. Students develop and apply skills in selecting and manipulating type to evoke different moods and emotions, and use a range of manual and digital methods when creating and manipulating images. Students consider the suitability of file formats of images for print and on-screen presentations and the relationship between images and type when communicating ideas and concepts. They use imagination and creative thinking techniques to stimulate curiosity and the development of divergent options when selecting and manipulating images and type for print and screen-based presentations. Broadly, in this area of study students focus on the design process stages of generating ideas and development of concepts. Students develop knowledge of their legal obligations regarding ownership of images and type and apply this knowledge when visually communicating ideas and concepts.
3. Applying the design process
This area of study focuses on the application of specific stages of the design process to organise thinking about approaches to solving design problems and presenting ideas. Students respond to a given brief addressing communication, environmental or industrial fields of design that outlines the messages or information to be conveyed to a target audience. The brief also provides a basis for reflection, as students develop an understanding of the iterative nature of this process by revisiting stages to meet the brief’s requirements. In response to a given brief, students engage in research and analysis to support their interpretation of the brief and as stimulus for imagining and generating ideas. Drawing on their creativity, students use a range of manual and/or digital methods, media and materials to generate ideas for further development. Students reflect on these options and further develop their preferred one. In response to their own evaluation, using the brief as a point of reference, students refine and present their visual communication. Throughout the design process students accumulate and annotate their drawings as part of their ongoing evaluation to assist with creating visual communications.

Unit Outcomes
On completion of this unit the student should be able to:
- Create presentation drawings that incorporate relevant technical drawing conventions and effectively communicate information and ideas for a selected design field
- Manipulate type and images to create visual communications suitable for print and screen-based presentations, taking into account copyright
- Engage in stages of the design process to create a visual communication appropriate to a given brief
Unit Description
In this unit 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. They investigate and experiment with the use of manual and digital methods, media and materials to make informed decisions when selecting suitable approaches for the development of their own design ideas and concepts. Students use their research and analysis of visual communication designers to support the development of their own work. They establish a brief and apply design thinking skills through the design process. They identify and describe a client, two distinctly different needs of that client, and the purpose, target audience, context and constraints relevant to each need. Design from a variety of historical and contemporary design fields is considered by students to provide directions, themes or starting points for investigation and inspiration for their own work. Students use observational and visualisation drawings to generate a wide range of design ideas and apply design thinking strategies to organise and evaluate their ideas. The brief and investigation work underpin the developmental and refinement work undertaken in Unit 4.

Areas of Study
1. Analysis and practice in context
   In this area of study students explore a range of existing visual communications in the communication, environmental and industrial design fields. The focus of each design field is:
   • communication – the design and presentation of visual information to convey ideas and concepts
   • environmental – the design and presentation of visual information for built/constructed environments
   • industrial – the design and presentation of visual information for manufactured products
   Students analyse how design elements, design principles, methods, media and materials are used in visual communications in these fields to achieve particular purposes for targeted audiences. Students draw on their findings from the analysis to inform the creation of their own visual communications and they articulate these connections. In response to given stimulus material, students apply skills to create visual communications for different purposes, audiences and contexts using a range of manual and digital methods, media and materials. The visual communications created by students include a two- and/or three-dimensional presentation drawing

2. Design industry practice
   In this area of study students investigate how the design process is applied in industry to create visual communications. Students develop an understanding of the processes and practices used to support collaboration between clients, designers and specialists when designing and producing these visual communications. Students develop an understanding of the function of the brief and approaches to its development. They examine how design and production decisions made during the design process are influenced by a range of factors. Students develop an understanding of the legal obligations of designers and clients with respect to ownership of intellectual property and how these obligations may affect decision making
3. Developing a brief and generating ideas
In this area of study students gain a detailed understanding of three stages of the design process: development of a brief, research and the generation of ideas. Students develop an understanding of the contents of a brief and the critical role that it plays in forming the direction and boundaries for their research and generation of ideas. They apply this knowledge when developing a single brief that proposes and defines two distinct communication needs for a real or imaginary client. When defining the two needs for the client, students establish two clearly different directions that are distinct in their intentions and that will result in separate final presentation formats. For each need, consideration must be given to the target audience, the purposes of the communication and the possible contexts. These become the criteria to inform further decisions in the design process, and students must apply this process twice; once for each need. Students undertake research to gather information about each of the client’s needs and for inspiration in responding to the brief. Ideas are generated and explored, and possible methods, media and materials are investigated. Books, magazines, films, popular media, the internet, photographs, interviews, exhibitions and site visits can serve as sources of inspiration and information. Copyright and source acknowledgment conventions are observed. The findings of the research and explorations are collated and then analysed using annotations and sketches to explain how they may be used to satisfy the brief. Students use both observational and visualisation drawings to investigate and document their ideas and approaches. Students apply design thinking techniques to support creative and reflective thinking and to organise their ideas. This work informs the evaluation and selection of design ideas that are developed into design concepts and presented as final visual communications in Unit 4.

Unit Outcomes
On completion of this unit the student should be able to:
- Create visual communications for specific contexts, purposes and audiences that are informed by their analysis of existing visual communications
- Describe how visual communications are designed and produced in the design industry and explain factors that influence these practices
- Apply design thinking skills in preparing a brief, undertaking research and generating a range of ideas relevant to the brief
Visual Communication Design

Unit 4
Design Development and Presentation

Unit Description
The focus of this unit is the development of design concepts and two final presentations of visual communications to meet the requirements of the brief. This involves applying the design process twice to meet each of the stated needs. Having completed their brief and generated ideas in Unit 3, students continue the design process 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. As students revisit stages to undertake further research or idea generation when developing and presenting their design solutions, they develop an understanding of the iterative nature of the design process. Ongoing reflection and evaluation of design solutions against the brief assists students with keeping their endeavours focused. Students refine and present two visual communications within the parameters of the brief. They reflect on the design process and the design decisions they took in the realisation of their ideas. They evaluate their visual communications and devise a pitch to communicate their design thinking and decision making to the client.

Areas of Study

1. Development of design concepts
   In this area of study students focus on the design process stages of the development of concepts and refinement. Using separate design processes, students develop and refine design concepts that satisfy each of the needs of the brief established in Unit 3. When selecting ideas to develop as concepts, students must ensure that each idea is discernibly different in intent and presentation format. Students manipulate and apply design elements and design principles to create concepts that attract the interest of their target audience and convey the messages, ideas and information required to satisfy the brief. Students explore and develop expertise in a range of appropriate manual and digital methods, materials and media for use in the design solutions for the brief. Two-dimensional and three-dimensional drawing methods may be used to assist with visualising and presenting solutions and determining proportions and scale if appropriate. Students apply design thinking techniques and use mock-ups to test and evaluate the suitability of each design concept. For each selected concept they further refine it in preparation for the final presentation. Students apply techniques to acquire feedback and to reflect and record the design thinking behind their decision making.

2. Final presentations
   This area of study focuses on the final stage in the design process, the resolution of presentations. Students produce two final visual communication presentations, which are the refinements of the concepts developed in Outcome 1. This involves selecting and applying materials, methods, media, design elements and design principles appropriate to the designs and selected presentation formats. Students explore ways of presenting their final visual communications that attract and engage the target audiences.

3. Evaluation and explanation
   In this area of study students devise a pitch to present and explain their visual communications. Their pitch is informed by an evaluation of the ways that the final visual communications meet the requirements of the brief and the design decisions made throughout the design process. Students explain their thinking behind each visual communication and the reasons for their selection and use of particular materials, media and methods, design elements, design principles, and presentation formats. They draw on their annotations and reflections assembled during the design process to evaluate the effectiveness of their design solutions in relation to the requirements of the brief. Students consider client responses to their pitch. They may respond to questions and offer further clarification of their visual communication.
Unit Outcomes
On completion of this unit the student should be able to:

- Develop distinctly different design concepts for each need, and select and refine for each need a concept that satisfies each of the requirements of the brief
- Produce final visual communication presentations that satisfy the requirements of the brief
- Devise a pitch to present and explain their visual communications to an audience and evaluate the visual communications against the brief