



# ANU H Course Creative Computing



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Australian  
National  
University

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Fiona Foley, Winged harvest 2001, Wood, aluminium, ochre and stainless steel, commissioned 2000  
(WEH Stanner Building courtyard)

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## H Courses

H classification is given to a year 11 and 12 course which is designed and accredited by the Board of Senior Secondary Studies (BSSS) and an Australian university, and where successful completion of the course will be recognised both towards the ACT Senior Secondary Certificate and an undergraduate degree with that university.

The BSSS considers H courses as complementary to studies in the home college. These extension courses allow students to pursue depth of study in an area of interest, while also gaining experience in a tertiary context to prepare for future studies.

## The ACT Senior Secondary System

The ACT senior secondary system recognises a range of university, vocational or life skills pathways.

The system is based on the premise that teachers are experts in their area: they know their students and community and are thus best placed to develop curriculum and assess students according to their needs and interests. Students have ownership of their learning and are respected as young adults who have a voice.

A defining feature of the system is school-based curriculum and continuous assessment. School-based curriculum provides flexibility for teachers to address students' needs and interests. College teachers have an opportunity to develop courses for implementation across ACT schools. Based on the courses that have been accredited by the BSSS, college teachers are responsible for developing programs of learning. A program of learning is developed by individual colleges to implement the courses and units they are delivering.

Teachers must deliver all content descriptions; however, they do have flexibility to emphasise some content descriptions over others. It is at the discretion of the teacher to select the texts or materials to demonstrate the content descriptions. Teachers can choose to deliver course units in any order and teach additional (not listed) content provided it meets the specific unit goals.

School-based continuous assessment means that students are continually assessed throughout years 11 and 12, with both years contributing equally to senior secondary certification. Teachers and students are positioned to have ownership of senior secondary assessment. The system allows teachers to learn from each other and to refine their judgement and develop expertise.

Senior secondary teachers have the flexibility to assess students in a variety of ways. For example: multimedia presentation, inquiry-based project, test, essay, performance and/or practical demonstration may all have their place. College teachers are responsible for developing assessment instruments with task specific rubrics and providing feedback to students.

The integrity of the ACT Senior Secondary Certificate is upheld by a robust, collaborative and rigorous structured consensus-based peer reviewed moderation process. System moderation involves all year 11 and 12 teachers from public, non-government and international colleges delivering the ACT Senior Secondary Certificate.

Only students who desire a pathway to university are required to sit a general aptitude test, referred to as the ACT Scaling Test (AST), which moderates student scores across courses and colleges. Students are required to use critical and creative thinking skills across a range of disciplines to solve problems. They are also required to interpret a stimulus and write an extended response.

Senior secondary curriculum makes provision for student-centred teaching approaches, integrated and project-based learning inquiry, formative assessment and teacher autonomy. ACT Senior Secondary Curriculum makes provision for diverse learners and students with mild to moderate intellectual disabilities, so that all students can achieve an ACT Senior Secondary Certificate.



The ACT Board of Senior Secondary Studies (BSSS) leads senior secondary education. It is responsible for quality assurance in senior secondary curriculum, assessment and certification. The Board consists of nominees from colleges, professional bodies, universities, industry, parent/carer organisations and unions. The Office of the Board of Senior Secondary Studies (OBSSS) consists of professional and administrative staff who support the Board in achieving its objectives and functions.

## **ACT Senior Secondary Certificate**

Courses of study for the ACT Senior Secondary Certificate:

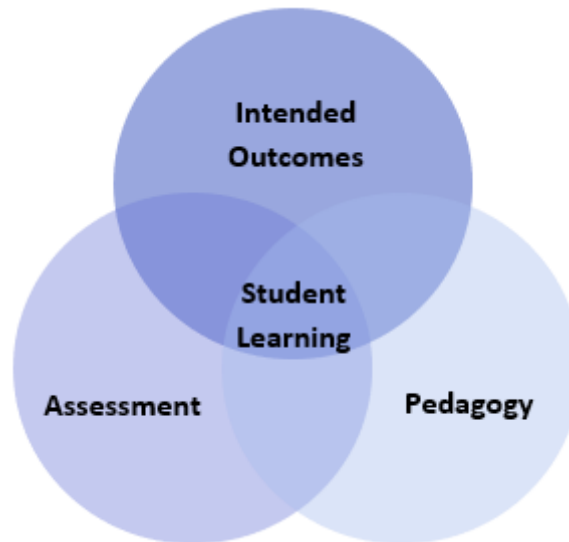
- provide a variety of pathways, to meet different learning needs and encourage students to complete their secondary education
- enable students to develop the essential capabilities for twenty-first century learners
- empower students as active participants in their own learning
- engage students in contemporary issues relevant to their lives
- foster students' intellectual, social and ethical development
- nurture students' wellbeing, and physical and spiritual development
- enable effective and respectful participation in a diverse society.

Each course of study:

- comprises an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum
- is based on a model of learning that integrates intended student outcomes, pedagogy and assessment
- outlines teaching strategies which are grounded in learning principles and encompass quality teaching
- promotes intellectual quality, establish a rich learning environment and generate relevant connections between learning and life experiences
- provides formal assessment and certification of students' achievements.

## Underpinning beliefs

- All students are able to learn.
- Learning is a partnership between students and teachers.
- Teachers are responsible for advancing student learning.



## Learning Principles

1. Learning builds on existing knowledge, understandings and skills.  
*(Prior knowledge)*
2. When learning is organised around major concepts, principles and significant real world issues, within and across disciplines, it helps students make connections and build knowledge structures.  
*(Deep knowledge and connectedness)*
3. Learning is facilitated when students actively monitor their own learning and consciously develop ways of organising and applying knowledge within and across contexts.  
*(Metacognition)*
4. Learners' sense of self and motivation to learn affects learning.  
*(Self-concept)*
5. Learning needs to take place in a context of high expectations.  
*(High expectations)*
6. Learners learn in different ways and at different rates.  
*(Individual differences)*
7. Different cultural environments, including the use of language, shape learners' understandings and the way they learn.  
*(Socio-cultural effects)*
8. Learning is a social and collaborative function as well as an individual one.  
*(Collaborative learning)*
9. Learning is strengthened when learning outcomes and criteria for judging learning are made explicit and when students receive frequent feedback on their progress.  
*(Explicit expectations and feedback)*

## General Capabilities

All courses of study for the ACT Senior Secondary Certificate should enable students to develop essential capabilities for twenty-first century learners. These 'capabilities' comprise an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum.

The capabilities include:

- literacy
- numeracy
- information and communication technology (ICT)
- critical and creative thinking
- personal and social
- ethical understanding
- intercultural understanding

Courses of study for the ACT Senior Secondary Certificate should be both relevant to the lives of students and incorporate the contemporary issues they face. Hence, courses address the following three priorities. These priorities are:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability

Elaboration of these General Capabilities and priorities is available on the ACARA website at [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au).

### Literacy

In ANU H Course Creative Computing, students become literate as they develop the knowledge, skills and dispositions to interpret and use language confidently for listening, engaging in collaborate practice, and expressing their research and conclusions about questions and problems in Creative Computing, and consider how that translates into practical applications. Literacy in ANU H Course Creative Computing, involves students listening to, reading, viewing, speaking, writing and creating academic texts, and using and modifying language for different purposes in an academic university context.

### Numeracy

In ANU H Course Creative Computing, students become numerate as they develop the knowledge and skills to use numeracy confidently to create and interpret data as they research and communicate their findings from research and studies. They become aware of the contingency and malleability of data produced using mathematical methods. Numeracy in ANU H Course Creative Computing encompasses the knowledge, skills, behaviours and dispositions that students need to use mathematical knowledge in a wide range of situations. It involves students recognising and understanding the role of mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully.



## **Information and Communication Technology (ICT) Capability**

In ANU H Course Creative Computing, students develop Information and Communication Technology (ICT) capability as they learn to use ICT creatively and artistically to access, create and communicate information and ideas, solve problems and work collaboratively. They consider the ethics related to Creative computing in representing ideas and in regard to the regulatory environment. ICT capability involves students learning to make the most of the digital technologies available to them, adapting to new ways of studying and being, as technologies evolve and understanding the risks to themselves and others in a digital environment.

## **Critical and Creative Thinking**

In ANU H Course Creative Computing, students develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems in Creative Computing. They engage in thinking critically about issues and practical problems in Creative Computing. They think creatively about solutions to programming and creative problems. Critical and creative thinking involves students thinking broadly and deeply using skills, behaviours and dispositions such as reason, logic, resourcefulness, imagination and innovation.

## **Personal and Social Capability**

In ANU H Course Creative Computing, students develop personal and social capability as they learn to understand themselves and others, and manage their relationships, lives, work and learning more effectively in a university context. They develop the skills to engage in respectful and thoughtful discussion and investigation of solutions to problems. As they investigate questions in Creative Computing, they build personal and social capability through a range of practices including recognising and regulating emotions, developing empathy for others and understanding relationships, establishing and building positive relationships, making responsible decisions, working effectively in teams, handling challenging situations constructively and developing leadership skills. These will be further developed by learning to operate and learn in the university context.

## **Ethical Understanding**

In ANU H Course Creative Computing, students develop ethical understanding, as they identify and investigate the nature of ethical concepts and values and understand how reasoning can assist ethical judgement. Further, they problematise ethical knowledge by examining how ethics affects the generation and representations of knowledge in Creative Computing. Ethical understanding involves students building a strong personal and socially oriented ethical outlook that helps them to manage context, conflict and uncertainty, and to develop an awareness of the influence that their values and behaviour have on others through the exploration of their ethics as researchers and thinkers.

## **Intercultural Understanding**

In ANU H Course Creative Computing, students develop intercultural understanding as they learn to value their own cultures, languages and beliefs, and those of others. They come to understand how personal, group and national identities are shaped, and the variable and changing nature of culture. Intercultural understanding involves students learning about and engaging with diverse cultures in ways that recognise commonalities and differences, create connections with others and cultivate mutual respect.

## **Cross Curriculum Priorities**

### **Aboriginal and Torres Strait Islander Histories and Cultures**

The Aboriginal and Torres Strait Islander histories and cultures priority provides the opportunity for all young Australians to gain a deeper understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, deep knowledge traditions and holistic world views by engaging with the work of Indigenous artists and reflect on their experiences. This knowledge and understanding provided in ANU H Course Creative Computing, will enrich all learners' ability to participate positively in the ongoing development of Australia through a deepening knowledge and connection with the world's oldest continuous living cultures.

### **Asia and Australia's Engagement with Asia**

This priority in ANU H Course Creative Computing, will ensure that students learn about and recognise the diversity within and between the countries of the Asia region by engaging with the work of Asian and Asian Australian artists. They will develop knowledge and understanding of Asian societies, cultures, beliefs and environments. Asia literacy provides students with the skills to communicate and engage with the peoples of Asia so they can effectively live, work and learn in the region.

### **Sustainability**

The sustainability priority ANU H Course Creative Computing, provides the opportunity for students to develop an appreciation of the necessity of acting for a more sustainable future and so address the ongoing capacity of Earth to maintain all life and meet the needs of the present without compromising the needs of future generations. Students have the opportunity to explore themes related to sustainability in their art and the art of others.

# **ANU H Course**

## **Creative Computing**

### **Rationale**

Creative Computing will engage students in learning the fundamentals of computer programming through the creative process of making music and interactive visual art. This is not primarily a course in making music and visual art with specialised software. Rather, it is a course in the theory & practice of computer programming - all of the music and visual art students will make in this course will be made through learning to write computer programs.

In this interdisciplinary course students will engage in the creative process and the acquisition of advanced technical skills. They will develop an understanding of the design process as students present, test, validate, and evaluate their solutions. In doing so, they develop and extend their understanding of creativity, design and programming.

Students will derive benefits from engaging in learning in the university context. In interacting with scholarship and high-level expectations for learning, students will extend their capacities in academic and interpersonal communication, project organisation and collaboration. They will learn from and collaborate with other ANU creative computing students. This will allow students to critically enhance their understanding of themselves, world issues and the industry which welcomes the skills and capabilities developed in this course.

### **Goals**

All courses based on this framework should enable students to:

- analyse problems or challenges to determine needs for solutions or products
- apply the process of design (investigate, design, plan, manage, create, evaluate solutions)
- use critical and creative thinking to design innovative solutions
- produce or create solutions or products to address a need, problem or challenge
- evaluate and use technologies in a range of contexts
- demonstrate problem solving skills
- communicate to different audiences using a range of methods
- engage confidently with and responsibly select and manipulate appropriate technologies – materials, data, systems, tools and equipment.

### **Unit Titles**

- Fundamentals of Creative Computing
- Creative Computing Project.

## Organisation of Content

### Fundamentals of Creative Computing

This unit will introduce design and computer programming in the context of creating music and interactive artwork with code. Topics covered may include the nature and history of creative computing, UI/UX design, data representation, program organisation, control structures, algorithms, 2D/3D graphics, and audio signal processing.

### Creative Computing Project

In this course students will creatively inquire into a contemporary issue or concept. Drawing together the skills learned in *Fundamentals of Creative Computing*, students will design and build a standalone software artefact which to be performed/exhibited at an end-of-year for public exhibition. In addition to delivering a software artefact, at the end of this course students will be required to critically situate their artefact and design process in the broader context and history of creative computing and code art.

## Assessment

The identification of criteria within the achievement standards and assessment tasks types and weightings provide a common and agreed basis for the collection of evidence of student achievement.

**Assessment Criteria** (the dimensions of quality that teachers look for in evaluating student work) provide a common and agreed basis for judgement of performance against unit and course goals, within and across colleges. Over a course, teachers must use all these criteria to assess students' performance but are not required to use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

**Assessment Tasks** elicit responses that demonstrate the degree to which students have achieved the goals of a unit based on the assessment criteria. The Common Curriculum Elements (CCE) is a guide to developing assessment tasks that promote a range of thinking skills (see Appendix C). It is highly desirable that assessment tasks engage students in demonstrating higher order thinking.

**Rubrics** are constructed for individual tasks, informing the assessment criteria relevant for a particular task and can be used to assess a continuum that indicates levels of student performance against each criterion.

### Assessment Criteria

Students will be assessed on the degree to which they demonstrate:

- knowledge and understanding
- skills.

## Assessment Task Types

	Design Process	Design Solution(s)
	<b>Suggested tasks:</b> <ul style="list-style-type: none"> <li>• design development</li> <li>• design documentation</li> <li>• essay</li> <li>• extended response</li> <li>• oral presentation</li> <li>• podcast</li> <li>• portfolio (design process)</li> <li>• project management</li> <li>• report</li> <li>• research task</li> <li>• return brief</li> <li>• review</li> <li>• seminar</li> <li>• short response</li> <li>• storyboard</li> <li>• web portfolio</li> <li>• workshop</li> </ul>	<b>Suggested tasks:</b> <ul style="list-style-type: none"> <li>• digital artefact</li> <li>• digital asset</li> <li>• major project</li> <li>• network</li> <li>• portfolio</li> <li>• product</li> <li>• prototyping</li> <li>• software application</li> <li>• storyboard</li> <li>• website</li> </ul>
<b>Weightings in T 1.0 units</b>	40 - 60%	40 - 60%

## Additional Assessment Information

- For a standard unit (1.0), students must complete a minimum of three assessment tasks and a maximum of five.
- Assessment tasks for a standard (1.0) unit must be informed by the Achievement Standards.
- Students should experience a variety of task types and different modes of communication to demonstrate the Achievement Standards.

## Achievement Standards

A Year 12 student in any unit is assessed using the Year 12 achievement standards. A Year 11 student in any unit is assessed using the Year 11 achievement standards. Year 12 achievement standards reflect higher expectations of student achievement compared to the Year 11 achievement standards. Years 11 and 12 achievement standards are differentiated by cognitive demand, the number of dimensions and the depth of inquiry.

An achievement standard cannot be used as a rubric for an individual assessment task. Assessment is the responsibility of the college. Student tasks may be assessed using rubrics or marking schemes devised by the college. A teacher may use the achievement standards to inform development of rubrics. The verbs used in achievement standards may be reflected in the rubric. In the context of combined Years 11 and 12 classes, it is best practice to have a distinct rubric for Years 11 and 12. These rubrics should be available for students prior to completion of an assessment task so that success criteria are clear.



**Achievement Standards Technologies T Course Year 11**

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
<b>Knowledge and understanding</b>	<ul style="list-style-type: none"> <li>critically analyses the design process and evaluates constraints and implications for decision making</li> <li>synthesises technology theories, concepts and principles and evaluates the properties of materials or data or systems to address a need, problem, or challenge</li> <li>critically analyses technologies and evaluates ethical and sustainable application of technology</li> <li>thinks critically and creatively, drawing on data and information to solve complex problems</li> </ul>	<ul style="list-style-type: none"> <li>analyses the design process and explains constraints and implications for decision making</li> <li>analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem, or challenge</li> <li>analyses technologies and explains ethical and sustainable application of technology</li> <li>thinks critically, drawing on data and information to solve complex problems</li> </ul>	<ul style="list-style-type: none"> <li>explains the design process and describes constraints and implications for decision making</li> <li>explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem, or challenge</li> <li>explains technologies and describes ethical and sustainable application of technology</li> <li>thinks critically, drawing on data and information to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>describes the design process with some reference to constraints and implications for decision making</li> <li>describes technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge</li> <li>describes technologies with some reference to ethical and sustainable application of technology</li> <li>draws on data and information to solve problems and describes opportunities</li> </ul>	<ul style="list-style-type: none"> <li>identifies features of the design process with minimal reference to decision making</li> <li>identifies technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge</li> <li>identifies some features of technologies with minimal reference to ethical and sustainable application of technology</li> <li>applying minimal use of information and data</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with control and precision demonstrating understanding of the historical and cultural context and its impact</li> <li>creates innovative and high quality design solutions/products using techniques and approaches and justifies ideas coherently</li> <li>analyses potential prototypes and solutions analysing their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and its impact</li> <li>creates high-quality design solutions/products using techniques and approaches and justifies ideas coherently</li> <li>analyses potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects on their own thinking and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and its impact</li> <li>creates functional quality design solutions/products using techniques and approaches and explains ideas coherently</li> <li>explains potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects on their own thinking and explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of its impact</li> <li>creates simple, functional design solutions/products using some techniques and approaches and explains ideas</li> <li>describes potential prototypes and solutions with some reference to their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas in mediums to a variety of audiences using some evidence, metalanguage, and referencing</li> <li>reflects on their own thinking with some reference to inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with limited control demonstrating minimal evidence of understanding its impact</li> <li>creates design solutions/products using some basic techniques and approaches and describes ideas</li> <li>identifies potential prototypes and solutions with minimal reference to their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage, and some referencing</li> <li>reflects on their own thinking with minimal reference to planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively</li> </ul>

## Achievement Standards Technologies T Course Year 12

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
<b>Knowledge and understanding</b>	<ul style="list-style-type: none"> <li>critically analyses the design process and evaluates opportunities, constraints and implications for decision making</li> <li>critically analyses strategies, methodologies and procedures and evaluates their validity and reliability</li> <li>synthesises technology theories, concepts and principles and evaluates the properties of material or data or systems to address a need, problem, or challenge</li> <li>critically analyses technologies in a range of contexts and evaluates ethical and sustainable application of technology</li> <li>thinks critically and creatively, drawing on data and information to solve complex problems and evaluates opportunities for application of technology</li> </ul>	<ul style="list-style-type: none"> <li>analyses the design process and explains opportunities, constraints and implications for decision making</li> <li>analyses strategies, methodologies and procedures and explains their validity and reliability</li> <li>analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem, or challenge</li> <li>analyses technologies in a range of contexts and explains ethical and sustainable application of technology</li> <li>thinks critically, drawing on data and information to solve complex problems and analyses opportunities for application of technology</li> </ul>	<ul style="list-style-type: none"> <li>explains the design process and describes opportunities, constraints and implications for decision making</li> <li>explains strategies, methodologies and procedures and describes their validity and reliability</li> <li>explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem, or challenge</li> <li>explains technologies in a range of contexts and describes ethical and sustainable application of technology</li> <li>thinks critically, drawing on data and information at times to solve problems and explains opportunities for application of technology</li> </ul>	<ul style="list-style-type: none"> <li>describes the design process with some reference to opportunities, constraints and implications for decision making</li> <li>describes strategies, methodologies, and procedures with some reference to validity and reliability</li> <li>describes technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge</li> <li>describes technologies in a range of contexts with some reference to ethical and sustainable application of technology</li> <li>draws on data and information at times to solve problems and describes opportunities for application of technology</li> </ul>	<ul style="list-style-type: none"> <li>identifies features of the design process with minimal reference to decision making</li> <li>identifies some strategies, methodologies, and procedures with minimal reference to validity and reliability</li> <li>identifies technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge</li> <li>identifies some features of technologies in a range of contexts with minimal reference to ethical and sustainable application of technology</li> <li>identifies some opportunities for application of technology with limited use of information and data</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies demonstrating an understanding of the historical and cultural context and impact on individuals, groups, communities, and society</li> <li>creates innovative and high-quality design solutions/products using techniques and approaches and justifies ideas logically and coherently</li> <li>critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques &amp; strategies and capacity to work independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and impact on individuals, groups, communities, and society</li> <li>creates high quality design solutions/products using techniques and approaches and justifies ideas coherently</li> <li>analyses potential prototypes and solutions analysing their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects on their own thinking and that of others and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and the impact on individuals, groups, communities, and society</li> <li>creates functional design solutions/products using techniques and approaches and justifies ideas</li> <li>explains potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing</li> <li>reflects on their own thinking and that of others and explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of the impact on individuals, groups, communities, and society</li> <li>creates functional design solutions/products using some techniques and approaches and explains ideas</li> <li>describes potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates ideas in mediums to a variety of audiences using some evidence, metalanguage and referencing</li> <li>reflects on their own thinking with some reference to inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively</li> </ul>	<ul style="list-style-type: none"> <li>applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding of the impact on individuals, groups, communities, and society</li> <li>creates simple, functional design solutions/products using basic techniques and approaches and describes ideas</li> <li>identifies potential prototypes and solutions identifying their appropriateness and effectiveness via iterative improvement and review</li> <li>communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage, and some referencing</li> <li>reflects on their own thinking with minimal reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively</li> </ul>

## Fundamentals of Creative Computing

**Value: 1.0**

This unit will introduce design and computer programming in the context of creating music and interactive artwork with code. Topics covered may include the nature and history of creative computing, UI/UX design, data representation, program organisation, control structures, algorithms, 2D/3D graphics, and audio signal processing.

### Specific Unit Goals

This unit should enable students to:

- understand design and computer programming in the context of creating music and art
- develop and apply design and product development processes
- develop technical skills and computer languages skills to create art.

### Content Descriptions

All knowledge, understanding and skills below must be delivered:

#### Design process

- design, construct, and debug small to medium-sized computer programs
- evaluate visual and UI/UX design (including input from mouse/ keyboard/ camera/ microphone/ sensor devices) in a web interface.

#### Strategies, Methodologies and Procedures

- design and implement various algorithms for generating art & music, for example Markov chains, context-free grammars, L-systems, genetic algorithms, cellular automata, or other algorithmic compositional techniques.

#### Theories, concepts and materials

- apply software engineering concepts in a high-level programming language to create code-based artworks
- create an original work of interactive code artworks by conceptualising, planning and executing.

#### Contexts

- critically analyse the representation of social groups in creative computing
- apply ethical practices when working in the field of creative computing
- synthesise creativity and the cultural and legal regulatory requirements surrounding authorship and appropriation in the context of creative computing.

#### Communication

- communicate accurately with others using correct terms in an appropriate format, both orally and in writing
- communicate ideas and insights in a range of appropriate mediums to a variety of audiences
- evaluate and apply teamwork strategies for creative collaboration in a networked computing environment
- justify ideas coherently using appropriate evidence and accurate referencing.

## **Reflection**

- reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning
- reflect on learning and creative practices in a university context.

## **A guide to reading and implementing content descriptions**

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

## **Assessment**

Refer to pages 8 - 10.

## Creative Computing Project

**Value: 1.0**

In this course students will creatively inquire into a contemporary issue or concept. Drawing together the skills learned in *Fundamentals of Creative Computing*, students will design and build a standalone software artefact which is to be performed/exhibited at an end-of-year for public exhibition. In addition to delivering a software artefact, at the end of this course students will be required to critically situate their artefact and design process in the broader context and history of creative computing and code art.

### Specific Unit Goals

This unit should enable students to:

- research and understand issues through creative inquiry
- design, plan and implement a creative computing project
- synthesise design, creativity, programming and interpersonal skills to collaborate with others in creating works.

### Content Descriptions

All knowledge, understanding and skills below must be delivered:

#### Design Process

- design, construct, and debug medium to large-sized computer programs
- evaluate and apply design processes to produce computer programs for music and art.

#### Strategies Methodologies and Procedures

- synthesise ideas from multiple different media artworks into new creative computing artefacts
- critically analyse programs to assess their performance against specifications
- apply a narrative approach to creating interactive code-based artworks which resonate with or critique larger issues in society.

#### Theories Concepts and Materials

- evaluate and apply algorithmic techniques to create music
- create code-based artworks using software engineering and networking concepts, and with multiple hardware/software components.

#### Contexts

- critically analyse design ideas for the context of concert performance and/or exhibitions
- evaluate and apply collaborative work and communication structures/systems/theories.

#### Communication

- evaluate and apply communication techniques in art and music
- communicate ideas accurately and concisely
- evaluate and apply professional feedback models.

## **Reflection**

- critically analyse own performance and products
- reflect on learning and creative practices in a university context.

## **A guide to reading and implementing content descriptions**

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

## **Assessment**

Refer to pages 8 -10.



## Appendix A – Implementation Guidelines

### Available course patterns

A standard 1.0 value unit is delivered over at least 55 hours. To be awarded a course, students must complete at least the minimum units over the whole minor.

Course	Number of standard units to meet course requirements
Minor	Minimum of 2 units

Units in this course can be delivered in any order.

### Co-requisites for the course

Students must be enrolled in a tertiary Arts, Technologies, and/or IT course in their home college to be eligible for this H Course.

### Duplication of Content Rules

Students cannot be given credit towards the requirements for a Senior Secondary Certificate for a unit that significantly duplicates content in a unit studied in another course. The responsibility for preventing undesirable overlap of content studied by a student rests with the principal and the teacher delivering the course. Students will only be given credit for covering the content once.

### Guidelines for Delivery

#### Program of Learning

A program of learning is what a school provides to implement the course for a subject. This meets the requirements for context, scope and sequence set out in the Board endorsed course. Students follow programs of learning in a college as part of their senior secondary studies. The detail, design and layout of a program of learning are a college decision.

The program of learning must be documented to show the planned learning activities and experiences that meet the needs of particular groups of students, taking into account their interests, prior knowledge, abilities and backgrounds. The program of learning is a record of the learning experiences that enable students to achieve the knowledge, understanding and skills of the content descriptions. There is no requirement to submit a program of learning to the OBSSS for approval. The Principal will need to sign off at the end of Year 12 that courses have been delivered as accredited.

#### Content Descriptions

Are all content descriptions of equal importance? No. It depends on the focus of study. Teachers can customise their program of learning to meet their own students' needs, adding additional content descriptions if desired or emphasising some over others. A teacher must balance student needs with their responsibility to teach all content descriptions. It is mandatory that teachers address all content descriptions and that students engage with all content descriptions.

## **Moderation**

Moderation is a system designed and implemented to:

- provide comparability in the system of school-based assessment
- form the basis for valid and reliable assessment in senior secondary schools
- involve the ACT Board of Senior Secondary Studies and colleges in cooperation and partnership
- maintain the quality of school-based assessment and the credibility, validity and acceptability of Board certificates.

Moderation commences within individual colleges. Teachers develop assessment programs and instruments, apply assessment criteria, and allocate Unit Grades, according to the relevant Framework. Teachers within course teaching groups conduct consensus discussions to moderate marking or grading of individual assessment instruments and Unit Grade decisions.

### **The Moderation Model**

Moderation within the ACT encompasses structured, consensus-based peer review of Unit Grades for all accredited courses over two Moderation Days. In addition to Moderation Days, there is statistical moderation of course scores, including small group procedures, for T courses.

### **Moderation by Structured, Consensus-based Peer Review**

Consensus-based peer review involves the review of student work against system wide criteria and standards and the validation of Unit Grades. This is done by matching student performance with the criteria and standards outlined in the Achievement Standards, as stated in the Framework. Advice is then given to colleges to assist teachers with, or confirm, their judgments. In addition, feedback is given on the construction of assessment instruments.

### **Preparation for Structured, Consensus-based Peer Review**

Each year, teachers of Year 11 are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers of a Year 12 class should retain originals or copies of student work completed in Semester 1. Assessment and other documentation required by the Office of the Board of Senior Secondary Studies should also be kept. Year 11 work from Semester 2 of the previous year is presented for review at Moderation Day 1 in March, and Year 12 work from Semester 1 is presented for review at Moderation Day 2 in August.

In the lead up to Moderation Day, a College Course Presentation (comprised of a document folder and a set of student portfolios) is prepared for each A, T and M course/units offered by the school and is sent into the Office of the Board of Senior Secondary Studies.

## **The College Course Presentation**

The package of materials (College Course Presentation) presented by a college for review on moderation days in each course area will comprise the following:

- a folder containing supporting documentation as requested by the Office of the Board through memoranda to colleges
- a set of student portfolios containing marked and/or graded written and non-written assessment responses and completed criteria and standards feedback forms. Evidence of all assessment responses on which the unit grade decision has been made is to be included in the student review portfolios.

Specific requirements for subject areas and types of evidence to be presented for each Moderation Day will be outlined by the Board Secretariat through memoranda and Information Papers.

### **Visual evidence for judgements made about practical performances**

#### **(also refer to BSSS Website Guidelines)**

It is a requirement that schools' judgements of standards to practical performances (A/T/M) be supported by visual evidence (still photos or video).

The photographic evidence submitted must be drawn from practical skills performed as part of the assessment process.

Teachers should consult the BSSS guidelines at:

[http://www.bsss.act.edu.au/grade\\_moderation/moderation\\_information\\_for\\_teachers](http://www.bsss.act.edu.au/grade_moderation/moderation_information_for_teachers)

for current information regarding all moderation requirements including subject specific and photographic evidence.

## Appendix B – Course Developers

Name	College
Dr Ben Swift	Australian National University
Bruce Fuda	ACT Education Directorate

## Appendix C – Common Curriculum Elements

Common curriculum elements assist in the development of high-quality assessment tasks by encouraging breadth and depth and discrimination in levels of achievement.

Organisers	Elements	Examples
create, compose and apply	apply	ideas and procedures in unfamiliar situations, content and processes in non-routine settings
	compose	oral, written and multimodal texts, music, visual images, responses to complex topics, new outcomes
	represent	images, symbols or signs
	create	creative thinking to identify areas for change, growth and innovation, recognise opportunities, experiment to achieve innovative solutions, construct objects, imagine alternatives
	manipulate	images, text, data, points of view
analyse, synthesise and evaluate	justify	arguments, points of view, phenomena, choices
	hypothesise	statement/theory that can be tested by data
	extrapolate	trends, cause/effect, impact of a decision
	predict	data, trends, inferences
	evaluate	text, images, points of view, solutions, phenomenon, graphics
	test	validity of assumptions, ideas, procedures, strategies
	argue	trends, cause/effect, strengths and weaknesses
	reflect	on strengths and weaknesses
	synthesise	data and knowledge, points of view from several sources
	analyse	text, images, graphs, data, points of view
	examine	data, visual images, arguments, points of view
	investigate	issues, problems
organise, sequence and explain	sequence	text, data, relationships, arguments, patterns
	visualise	trends, futures, patterns, cause and effect
	compare/contrast	data, visual images, arguments, points of view
	discuss	issues, data, relationships, choices/options
	interpret	symbols, text, images, graphs
	explain	explicit/implicit assumptions, bias, themes/arguments, cause/effect, strengths/weaknesses
	translate	data, visual images, arguments, points of view
	assess	probabilities, choices/options
	select	main points, words, ideas in text
identify, summarise and plan	reproduce	information, data, words, images, graphics
	respond	data, visual images, arguments, points of view
	relate	events, processes, situations
	demonstrate	probabilities, choices/options
	describe	data, visual images, arguments, points of view
	plan	strategies, ideas in text, arguments
	classify	information, data, words, images
	identify	spatial relationships, patterns, interrelationships
	summarise	main points, words, ideas in text, review, draft and edit

## Appendix D – Glossary of Verbs

Verbs	Definition
Analyse	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences
Apply	Use, utilise or employ in a particular situation
Argue	Give reasons for or against something
Assess	Make a Judgement about the value of
Classify	Arrange into named categories in order to sort, group or identify
Compare	Estimate, measure or note how things are similar or dissimilar
Compose	The activity that occurs when students produce written, spoken, or visual texts
Contrast	Compare in such a way as to emphasise differences
Create	Bring into existence, to originate
Demonstrate	Give a practical exhibition an explanation
Describe	Give an account of characteristics or features
Discuss	Talk or write about a topic, taking into account different issues or ideas
Evaluate	Examine and judge the merit or significance of something
Examine	Determine the nature or condition of
Explain	Provide additional information that demonstrates understanding of reasoning and /or application
Extrapolate	Infer from what is known
Hypothesise	Put forward a supposition or conjecture to account for certain facts and used as a basis for further investigation by which it may be proved or disproved
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Planning, inquiry into and drawing conclusions about
Justify	Show how argument or conclusion is right or reasonable
Manipulate	Adapt or change
Plan	Strategize, develop a series of steps, processes
Predict	Suggest what might happen in the future or as a consequence of something
Reflect	The thought process by which students develop an understanding and appreciation of their own learning. This process draws on both cognitive and affective experience
Relate	Tell or report about happenings, events or circumstances
Represent	Use words, images, symbols or signs to convey meaning
Reproduce	Copy or make close imitation
Respond	React to a person or text
Select	Choose in preference to another or others
Sequence	Arrange in order
Summarise	Give a brief statement of the main points
Synthesise	Combine elements (information/ideas/components) into a coherent whole
Test	Examine qualities or abilities
Translate	Express in another language or form, or in simpler terms
Visualise	The ability to decode, interpret, create, question, challenge and evaluate texts that communicate with visual images as well as, or rather than, words



## Appendix E – Glossary for ACT Senior Secondary Curriculum

Courses will detail what teachers are expected to teach and students are expected to learn for year 11 and 12. They will describe the knowledge, understanding and skills that students will be expected to develop for each learning area across the years of schooling.

**Learning areas** are broad areas of the curriculum, including English, mathematics, science, the arts, languages, health and physical education.

A **subject** is a discrete area of study that is part of a learning area. There may be one or more subjects in a single learning area.

**Frameworks** are system documents for Years 11 and 12 which provide the basis for the development and accreditation of any course within a designated learning area. In addition, frameworks provide a common basis for assessment, moderation and reporting of student outcomes in courses based on the framework.

The **course** sets out the requirements for the implementation of a subject. Key elements of a course include the rationale, goals, content descriptions, assessment, and achievement standards as designated by the framework.

BSSS courses will be organised into units. A unit is a distinct focus of study within a course. A standard 1.0 unit is delivered for a minimum of 55 hours generally over one semester.

**Core** units are foundational units that provide students with the breadth of the subject.

**Additional** units are avenues of learning that cannot be provided for within the four core 1.0 standard units by an adjustment to the program of learning.

A **negotiated study unit** makes provision for students, classes, groups or individuals to negotiate the program of learning based on the specific unit goals, content descriptions, assessment and achievement standards of the course.

An **elective** is a lens for demonstrating the content descriptions within a standard 1.0 unit.

A **lens** is a particular focus or viewpoint within a broader study.

**Content descriptions** refer to the subject-based knowledge, understanding and skills to be taught and learned.

A **program of learning** is what a college develops to implement the course for a subject and to ensure that the content descriptions are taught and learned.

**Achievement standards** provide an indication of typical performance at five different levels (corresponding to grades A to E) following completion of study of senior secondary course content for units in a subject.

ACT senior secondary system **curriculum** comprises all BSSS approved courses of study.