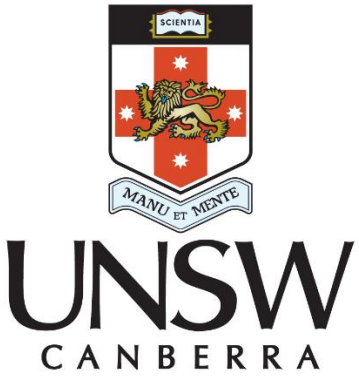


UNSW H Course
Systems Architecture

Table of Contents

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:

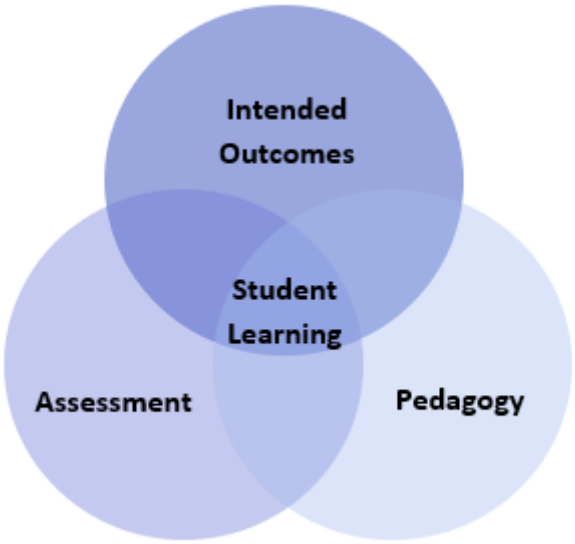
- provide a variety of pathways, to meet different learning needs and encourage students to complete their secondary education
- enable students to develop the essential capabilities for twenty-first century learners
- empower students as active participants in their own learning
- engage students in 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, establishes a rich learning environment, and generates 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.

Literacy

Students become literate as they develop the knowledge, skills and dispositions to interpret and use language confidently for learning and communicating in and out of school and in order to participate effectively in society. Literacy involves students in listening to, reading, viewing, speaking, writing and creating oral, print, visual and digital texts, and using and modifying language for different purposes in a range of contexts

Information Technology assists in the development of literacy by introducing specific terminology used in Networking and Security, statistics and other digital technologies contexts. Students will understand the specific language used to describe data, processes, products, information and services at a tertiary level. They will develop skills that empower them to be critical consumers of data and be able to access, interpret, analyse, challenge and critically evaluate the ever-expanding and changing knowledge base and influences in the field of Information Technology.

Students will learn to comprehend and compose tertiary level texts related to Information Technology. This includes learning to communicate effectively for a variety of purposes to different audiences, express their own ideas and opinions and evaluate the viewpoints of others.

Numeracy

Information Technology provides students with opportunities to develop deeper understanding of the mathematics that is implicit in the domain of Information Technology. As students engage with Information Technology, students will realise the critical importance of numeracy, be able to select relevant numeracy knowledge and skills, and apply these skills in a range of contexts. Teachers will introduce new concepts as required for the target student group, depending upon their prior studies in Mathematics. Students will use calculation, statistical and linear analytical

techniques to collect and interpret information related to a range of quantitative and qualitative data sources. Students will interpret and analyse information using statistical reasoning, to identify patterns and relationships in data, and consider trends, draw conclusions, make predictions and inform future developments in a range of fields**.**

Information and Communication Technology (ICT) Capability

ICT capability is deeply embedded in the Networking and Security course, which builds directly from the 9-10 bands of the Australian Curriculum in Digital Technologies. Students will further develop their ICT capability across all aspects of the Digital Technologies curriculum: Digital Systems, Data Representation, Data Collection, Data Interpretation, Specification, Algorithms, Impact and Interactions. Students of Networking and Security will learn to effectively and safely access online resources for researching, analysing and interpreting data which will help develop understandings of safety, security, and ethical use of data. Students will further develop their understanding of the role ICT plays in the lives and relationships of young people. Students will develop an understanding of ethical online behaviour, including protocols and practices for using ICT for respectful communication. Students will use ICT as key tools for communicating, collaborating, creating content, seeking help, accessing information and analysing performance in a range of disciplines.

Critical and Creative Thinking

Information Technology develops students' ability to think logically, critically and creatively in response to a wide range of ideas and challenges within the field of Information Technology. Students will learn how to critically evaluate evidence related to the learning area and the broad range of associated media messages to creatively generate and explore original alternatives and possibilities. Students' critical and creative thinking skills will be developed through learning experiences that encourage them to pose questions and seek solutions to contemporary issues in Information Technology. They will learn how to design appropriate strategies to promote and advocate ethical and sustainable use of sophisticated data-driven systems, such as Machine Learning.

Personal and Social Capability

Students develop personal and social capability as they engage in project management and development in a collaborative workspace. They direct their own learning, plan and carry out investigations, and become independent learners who can apply design thinking, technologies understanding and skills when making decisions. Students develop social and employability skills through working cooperatively in teams, sharing and discussing ideas about problems, progress, and innovative solutions, and listening to and respecting the perspectives of others. There are collaborative opportunities for sharing resources and processes, making group decisions, resolving conflict and showing leadership.

Ethical Understanding

Students develop the capacity to understand and apply ethical and socially responsible principles when collaborating with others and creating, sharing and using technologies. When engaged in systems thinking, students evaluate their findings against the criteria of legality, environmental sustainability, economic viability, health, social and emotional responsibility, and social awareness. Students learn about safe and ethical procedures for investigating and working with people, data and materials. They consider their own roles and responsibilities as discerning citizens and learn to detect bias and inaccuracies. Understanding the protection of data, intellectual property and individual privacy in the school environment helps students to be ethical digital citizens.

Intercultural Understanding

Information Technology will provide opportunities for students to recognise and respect different ways of thinking about a wide range of personal, social and global issues across a range of

disciplines. Students will learn about individual, government, and group participation when engaging with automated and systematic data collection. They will gain an appreciation that differences in beliefs and perspectives may affect people's engagement with digital technologies and data collection systems.

Students will learn to act in ways that maintain individual and group integrity and respect human rights. They will examine stereotypical representations of various social and cultural groups in relation to a range of issues. In doing so, students will gain an understanding of how culture shapes personal and social perspectives and interactions. They will develop an understanding, within a selected domain of research, the role of values on families, social groups and institutions, and the broader community.

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. This knowledge and understanding 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

The Asia and Australia's engagement with Asia priority ensures that students learn about and recognise the diversity within and between the countries of the Asia region. They develop knowledge and understanding of Asian societies, cultures, beliefs and environments, and the connections between the peoples of Asia, Australia, and the rest of the world. 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. Students investigate a range of contexts that draw on Asia and Australia's engagement with Asia.

Sustainability

The sustainability priority provides the opportunity for students to develop the knowledge, skills, values and world views necessary for them to act in ways that contribute to more sustainable patterns of living. This priority is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence. Representations of data are critical to decision making in sustainability issues.

UNSW H Course Systems Architecture

H

Rationale

Information Technology is the engine room of contemporary innovation and economic productivity. In depth study in information technology empowers students to engage in a range of significant social, technological and ethical debates at the centre of the lived experience of people across the world. Further, holding knowledge, understanding and skills in information technology allows students access to a wide range of employment, entrepreneurial and leisure pursuits. This course will extend the understanding of students in IT courses in schools to develop a sophisticated and well-informed understanding of operating systems and new and emerging technologies. It will extend their capacity to work on complex IT projects and find solutions to problems in IT.

Students will engage in first year university level work and processes to support their understanding of studying at the university level, encouraging easy transition to further study in IT and related STEM fields. The selected topics in Information Technology that will be pursued in this course are foundational to understanding the field, but will be pursued in depth and detail and with access to expertise beyond the secondary setting. It is an opportunity for students to engage in these concepts, practices and technical skills at a level that extends them into new areas of knowledge.

Goals

This course enables 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

- Foundations of Operating Systems
- Networks and Emerging Technologies

Organisation of Content

Foundations of Operating Systems

This unit introduces students to fundamentals of software and hardware. They will explore different types of data and how they are represented. They will evaluate operating systems as an information system, including their architecture and components, how files are saved, how memory works, and how it is processed. They will undertake case studies of operating systems, Linux and Windows, to demonstrate principles and solve problems using their analysis and evaluation. They will apply knowledge and understanding to manage operating systems. This unit lays the foundation for further work in security and networking courses by providing detailed understanding of systems and users.

Networks and Emerging Technologies

In this unit, students will synthesise the fundamental concepts and features of networking and apply them to practical tasks and solve problems, including how various protocols in OSI and TCP/IP models enable efficient and secure communication between different architectures and homogeneous and heterogeneous systems, devices and mediums. Students investigate the rise of Internet of Things (IoT), and block chain and evaluate how ethics, sustainability, efficiency and cost apply to these emerging technologies.

Assessment

The identification of criteria within the achievement standards and assessment task types and weightings provides 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)
	Suggested tasks: • design development • design documentation • essay • extended response • oral presentation • podcast • portfolio (design process) • project management • report • research task • return brief • review • seminar • short response • storyboard • web portfolio • workshop	**Suggested tasks:** • digital artefact • digital asset • major project • network • portfolio • product • prototyping • software application • storyboard • website
Weightings in A/V 1.0 and 0.5 units	30 - 70%	30 - 70%
Weightings in T/V 1.0 and 0.5 units	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.
- For a half standard unit (0.5), students must complete a minimum of two and a maximum of three assessment tasks.
- Assessment tasks for a standard (1.0) or half-standard (0.5) 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.
- For tasks completed in unsupervised contexts, schools must have procedure and processes to maintain academic integrity of tasks.

Achievement Standards

Years 11 and 12 Achievement Standards are written for T courses. H courses use T 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

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• critically analyses the design process and evaluates constraints and implications for decision making • synthesises technology theories, concepts and principles and evaluates the properties of materials or data or systems to address a need, problem, or challenge • critically analyses technologies and evaluates ethical and sustainable application of technology • thinks critically and creatively, drawing on data and information to solve complex problems	• analyses the design process and explains constraints and implications for decision making • analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem, or challenge • analyses technologies and explains ethical and sustainable application of technology • thinks critically, drawing on data and information to solve complex problems	• explains the design process and describes constraints and implications for decision making • explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem, or challenge • explains technologies and describes ethical and sustainable application of technology • thinks critically, drawing on data and information to solve problems	• describes the design process with some reference to constraints and implications for decision making • describes technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge • describes technologies with some reference to ethical and sustainable application of technology • draws on data and information to solve problems and describes opportunities	• identifies features of the design process with minimal reference to decision making • identifies technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge • identifies some features of technologies with minimal reference to ethical and sustainable application of technology • applying minimal use of information and data
Skills	• applies technology concepts, strategies and methodologies with control and precision demonstrating understanding of the historical and cultural context and its impact • creates innovative and high quality design solutions/products using techniques and approaches and justifies ideas coherently • analyses potential prototypes and solutions analysing their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and its impact • creates high-quality design solutions/products using techniques and approaches and justifies ideas coherently • analyses potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and its impact • creates functional quality design solutions/products using techniques and approaches and explains ideas coherently • explains potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of its impact • creates simple, functional design solutions/products using some techniques and approaches and explains ideas • describes potential prototypes and solutions with some reference to their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums to a variety of audiences using some evidence, metalanguage, and referencing • 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	• applies technology concepts, strategies and methodologies with limited control demonstrating minimal evidence of understanding its impact • creates design solutions/products using some basic techniques and approaches and describes ideas • identifies potential prototypes and solutions with minimal reference to their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage, and some referencing • 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

Achievement Standards Technologies T Course Year 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• critically analyses the design process and evaluates opportunities, constraints and implications for decision making • critically analyses strategies, methodologies and procedures and evaluates their validity and reliability • synthesises technology theories, concepts and principles and evaluates the properties of material or data or systems to address a need, problem, or challenge • critically analyses technologies in a range of contexts and evaluates ethical and sustainable application of technology • thinks critically and creatively, drawing on data and information to solve complex problems and evaluates opportunities for application of technology	• analyses the design process and explains opportunities, constraints and implications for decision making • analyses strategies, methodologies and procedures and explains their validity and reliability • analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem, or challenge • analyses technologies in a range of contexts and explains ethical and sustainable application of technology • thinks critically, drawing on data and information to solve complex problems and analyses opportunities for application of technology	• explains the design process and describes opportunities, constraints and implications for decision making • explains strategies, methodologies and procedures and describes their validity and reliability • explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem, or challenge • explains technologies in a range of contexts and describes ethical and sustainable application of technology • thinks critically, drawing on data and information at times to solve problems and explains opportunities for application of technology	• describes the design process with some reference to opportunities, constraints and implications for decision making • describes strategies, methodologies, and procedures with some reference to validity and reliability • describes technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge • describes technologies in a range of contexts with some reference to ethical and sustainable application of technology • draws on data and information at times to solve problems and describes opportunities for application of technology	• identifies features of the design process with minimal reference to decision making • identifies some strategies, methodologies, and procedures with minimal reference to validity and reliability • identifies technology theories, concepts, and principles with some reference to properties of materials or data or systems to address a need, problem, or challenge • identifies some features of technologies in a range of contexts with minimal reference to ethical and sustainable application of technology • identifies some opportunities for application of technology with limited use of information and data
Skills	• applies technology concepts, strategies and methodologies demonstrating an understanding of the historical and cultural context and impact on individuals, groups, communities, and society • creates innovative and high-quality design solutions/products using techniques and approaches and justifies ideas logically and coherently • critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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 & strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and impact on individuals, groups, communities, and society • creates high quality design solutions/products using techniques and approaches and justifies ideas coherently • analyses potential prototypes and solutions analysing their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and the impact on individuals, groups, communities, and society • creates functional design solutions/products using techniques and approaches and justifies ideas • explains potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage, and accurate referencing • 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	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of the impact on individuals, groups, communities, and society • creates functional design solutions/products using some techniques and approaches and explains ideas • describes potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums to a variety of audiences using some evidence, metalanguage and referencing • 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	• applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding of the impact on individuals, groups, communities, and society • creates simple, functional design solutions/products using basic techniques and approaches and describes ideas • identifies potential prototypes and solutions identifying their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage, and some referencing • 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

Foundations of Operating Systems — Value: 1.0

Foundations of Operating Systems a — **Value 0.5**

Foundations of Operating Systems b — **Value 0.5**

Unit Description

This unit introduces students to fundamentals of software and hardware. They will explore different types of data and how they are represented. They will evaluate operating systems as an information system, including their architecture and components, how files are saved, how memory works, and how it is processed. They will undertake case studies of operating systems, Linux and Windows, to demonstrate principles and solve problems using their analysis and evaluation. They will apply knowledge and understanding to manage operating systems. This unit lays the foundation for further work in security and networking courses by providing detailed understanding of systems and users.

Specific Unit Goals

This unit should enable students to:

- evaluate operating systems as an information systems, including their architecture, components and services such as storage, memory, processes and user management
- apply knowledge and understanding to manage operating systems to real-world challenges and technological environments
- critically analyse strengths and shortcomings of operating systems including Linux and Windows in the context of real-world scenarios

Content Descriptions

All knowledge, understanding and skills below must be delivered:

Knowledge and Understanding

- evaluate operating systems as an information system, including their architecture, components and services such as storage, memory, processes and user management
- undertake case studies of operating systems, Linux and Windows, to demonstrate principles and solve problems using operating system features and capabilities, for example, Windows, Linux and Mac- compared and contrasted; working with Linux and Windows
- apply knowledge and understanding to manage operating systems to real-world challenges and technological environments
- critically analyses strengths and shortcomings of operating systems in the context of real-world scenarios, for example, software support, security of open-source vs closed source, compatibility and risks associated with their deployment and usage in production environments.
- critically analyses Linux and Windows, their unique approach to software development, community collaboration and sustainability

- critically analyses the design process and evaluates opportunities, constraints and implications for decision making

Skills

- applies operating systems concepts, strategies and methodologies appropriate to the relevant historical and cultural context of the problems for example, maintenance, deployment and design and improvement of operating systems
- critically analyse problems and find solutions that consider the impact on relevant individuals, groups, communities, and society
- creates solutions to problems in current operating systems using efficient and effective Information Technology techniques and approaches to everyday tasks
- justifies ideas and solutions logically and coherently using industry terminology and formats
- critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review
- communicates complex Information Technology ideas and insights effectively in mediums appropriate for tertiary and industry settings, using appropriate evidence, metalanguage, and accurate referencing
- reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management
- uses appropriate techniques & strategies to work independently and collaboratively and reflect on effective practices and habits to build their own capacity

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 emphasise 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 11-15.

Networking and Emerging Technologies Value: 1.0

Networking and Emerging Technologies a Value 0.5
Networking and Emerging Technologies b Value 0.5

Unit Description

In this unit, students will synthesise the fundamental concepts and features of networking and apply them to practical tasks and solve problems, including how various protocols in OSI and TCP/IP models enable efficient and secure communication between different architectures and homogeneous and heterogeneous systems, devices and mediums. Students investigate network infrastructures and associated emerging technologies and evaluate their sustainability, efficiency cost and ethical implications.

Specific Unit Goals

This unit should enable students to:

- synthesise knowledge, understanding and skills related to networking and networking concepts for practical tasks and to solve problems, including how various protocols in OSI and TCP/IP models enable efficient and secure communication between different architectures and homogeneous and heterogeneous systems, devices and mediums
- critically analyse network architecture and their associated emerging technologies (such as Internet of Things (IOT), and block chain) and evaluate how these concepts have been applied to other real-world settings, such as cryptocurrency, digital record management and finance
- evaluate the ethics, sustainability, efficiency and cost of utilising emerging technologies in real-world settings

Content Descriptions

All knowledge, understanding and skills below must be delivered:

Knowledge and Understanding

- synthesise knowledge, understanding and skills related to networking and networking concepts for practical tasks and to solve problems, including how various protocols in OSI and TCP/IP models enable efficient and secure communication between different architectures and homogeneous and heterogeneous systems, devices and medium
- critically analyse network architecture and their associated emerging technologies (such as Internet of Things (IOT), and block chain) and evaluate how these concepts have been applied to other real-world settings, such as cryptocurrency, digital record management and finance
- evaluates the ethics, sustainability, efficiency and cost of utilising emerging technologies in real-world settings

- critically analyses the design process and evaluates advantages, constraints and implications of network architectures and selection of emerging technologies, such as IoT or block chain

Skills

- applies networking concepts, strategies and methodologies appropriate to the relevant historical and cultural context of the problems
- critically analyse problems and find solutions that consider the impact on relevant individuals, groups, communities, and society
- creates solutions to problems in networking using efficient and effective Information Technology techniques and approaches to everyday tasks
- justifies ideas and solutions logically and coherently using industry terminology and formats
- critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review
- communicates complex Information Technology ideas and insights effectively in mediums appropriate for tertiary and industry settings, using appropriate evidence, metalanguage, and accurate referencing
- reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management
- uses appropriate techniques & strategies to work independently and collaboratively and reflect on effective practices and habits to build their own capacity

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 emphasise 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 11-15.

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

Corequisites for the course

Students must be undertaking studies in an Information Technology course to be able to be in this course.

Arrangements for students continuing study in this course

There is no previous course 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.

Half standard 0.5 units

Half standard units appear on the course adoption form but are not explicitly documented in courses. It is at the discretion of the college principal to split a standard 1.0 unit into two half standard 0.5 units. Colleges are required to adopt the half standard 0.5 units. However, colleges are

not required to submit explicit documentation outlining their half standard 0.5 units to the BSSS. Colleges must assess students using the half standard 0.5 assessment task weightings outlined in the framework. It is the responsibility of the college principal to ensure that all content is delivered in units approved by the Board.

Moderation

System Moderation

System moderation begins in schools whereby teachers cooperate to develop assessment, and grade and score student assessment according to the relevant curriculum.

Moderation Day is an essential component of the ACT senior secondary system which empowers school autonomy in curriculum and assessment. Moderation Day is a collaborative and professional event whereby schools undertake system quality assurance activities on behalf of their current and future students. Moderation Day fosters and enriches the development of quality assessment and validates student achievement. Continued best practice in teaching and learning is ensured through the formation of valid, constructive, and detailed feedback.

System Moderation:

- provides comparability of school-based assessment
- forms the basis for valid and reliable assessment in senior secondary schools
- involves the ACT Board of Senior Secondary Studies (BSSS) and schools in cooperation and partnership
- maintains the integrity of the ACT Senior Secondary Certificate.

The Moderation Model

Moderation within the ACT senior secondary system encompasses structured, consensus-based peer review of Unit Grades and quality of assessment for all BSSS courses twice per year. In addition to System Moderation, there is statistical moderation of course scores.

Moderation by Structured, Consensus-based Peer Moderation

Consensus-based peer moderation involves the review of student assessment against system wide criteria and standards and the validation of Unit Grades. This is done by matching student performance with the Framework Achievement Standards. In addition, feedback will be provided on the quality of the task.

Preparation for Structured, Consensus-based Peer Review

Schools retain originals or copies of student assessment evidence completed in the delivery of the unit and all unit documentation. Student assessment evidence must be sufficient to allow reviewing teachers to make an accurate judgment of grade standard. Schools will use ACS to present this information for System Moderation. Criteria for each Moderation Day will be communicated to schools in the proceeding calendar year.

Feedback from System Moderation

Feedback is provided to schools to affirm good practice and inform continuous improvement. This feedback is based on the BSSS Quality Assessment Guidelines and relevant course documents. It is expected that schools engage with feedback and address any longitudinal trends as outlined in the *BSSS Policy and Procedures Manual*.

Appendix B – Course Developers

Name	**College**
Dr Masood Mansoori	University of New South Wales

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
Critically analyse	Analysis that engages with criticism and existing debate on the issue
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.

An **Independent Study unit** is a pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by a student and negotiated with their teacher but must meet the specific unit goals and content descriptions as they appear in the course.

An **elective** is a lens for demonstrating the content descriptions within a standard 1.0 or half standard 0.5 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.