

## Strand Content

<b>Years 11 – 13</b>
<b>Digital concepts and tools</b>
<b>Indicators</b>
<p>Note: Use discretion according to student capability and the requirements of strands and assessments.</p> <ul style="list-style-type: none"><li>• Use digital resources to effectively find, analyse, and use information (inquiry process)</li><li>• Demonstrate discernment as a consumer of information, and acquire skills for determining validity of information</li><li>• Select and apply appropriate planning tools</li><li>• Apply evaluative skills to inform outcomes</li><li>• Recognise the importance of safe working practices</li><li>• Recognise the importance of appropriate/ethical use of digital technologies</li><li>• Develop an appropriate file management structure</li><li>• Develop appropriate data management strategies across multiple platforms (such as flash drive, web storage, and email systems)</li><li>• Understand and practise data security strategies (such as back-up and versioning)</li><li>• Self-direct problem-solving for software/application issues</li><li>• Develop appropriate communication skills (such as note taking, 'netiquette', survey/key questions, and interview techniques)</li></ul>
<p><b>The digital concepts and tools strand does not have key areas of knowledge as the other strands do. It is a set of indicators that would be included as part of any digital technologies course outline. It is expected that indicators for this strand will be added as the project develops.</b></p>

**Year 11**

**Digital society**

*Students will be able to:*

- explore the impact of digital technologies on society.

**Indicators**

- Understand and discuss the effect of people's perception of digital technology developments
- Understand common practices and standards within the digital technology environment
- Explore the impact of emerging technologies
- Demonstrate an understanding of cyber-safe practices and ethical behaviour within a digital technology environment
- Investigate the changing nature of careers and employment within the digital technology field

**Key areas of knowledge**

- Research and present the effect of advancement in digital technology within a local community, societal, or global setting
- Explore, understand, and apply ethical behaviour
- Identify emerging technologies and the impact of these within a range of settings (such as classroom, home life, workplace, careers, and global interaction and involvement)
- Consider the range of career options within this field and the evolving nature of these career opportunities
- Explore personal responsibility

**Note:** Aspects of this strand could be incorporated into other areas eg Careers & courses

**Year 12**

**Digital society**

*Students will be able to:*

- understand and discuss the interaction between digital technologies within local and global settings.

**Indicators**

- Explore the social, ethical, and human issues and perceptions related to digital technologies and past and future trends
- Understand common practices and developed standards/conventions within the digital technology environment
- Critically analyse an emerging technology and the effect this has on daily life
- Use creative and innovative thinking to illustrate and discuss potential future technologies and the impact of these
- Use collaborative skills to achieve an outcome
- Demonstrate a comprehensive understanding of cyber-safe practices and ethical behaviour within a digital technology environment

**Key areas of knowledge**

- Research and discuss the effect of new emerging technologies within a range of settings
- Explore, understand, apply, and analyse ethical behaviour
- Identify common practices and conventions to support ethical use of digital technologies
- Identify sustainable practices in the digital technology environment
- Contemporary use of digital tools and methodologies in today's global society
- Emerging trends in digital technology fields
- Limitations of digital technologies and discussion of potential solutions
- Social contexts versus business contexts in the use of digital technologies
- Environmental impact and health and safety
- Explore people's perceptions of a specific technological idea, application, or device

**Year 13**

**Digital society**

*Students will be able to:*

- discuss, compare, and analyse digital solutions for contemporary issues.

**Indicators**

- Explore and discuss emerging trends in digital technologies
- Identify and discuss solutions to the impact of digital technologies on society – locally and globally
- Examine legislation and codes of practice within the digital technology field
- Examine the enterprising use of digital technologies in local and global settings
- Examine and explore the issues and impact of sustainability and environmental impact of digital technologies
- Examine the control and perception of digital technologies in different cultural settings
- Identify and discuss societal traits emerging in new generations that are using digital technologies in new ways

**Key areas of knowledge**

- The use of digital technologies in societal generations (generation y and digital natives)
- Contemporary use, and emerging and potential trends of digital technology in society
- Limitations and opportunities
- Legislation concerning digital technologies
- Environmental impact, and health and safety
- Ethical behaviour and social contexts
- Collaborative projects – local and global interaction
- Sustainability and globalisation
- Forecast trends and new technologies
- Case studies

**Year 11**

**Business technology**

*Students will be able to:*

- use and apply digital tools and concepts for the management and presentation of information.

**Indicators**

- Understand the purpose of the major software applications – selecting the right application for the right purpose
- Understand and efficiently use a variety of functions within software applications
- Use software applications to produce effective outcomes
- Combine information from multiple sources to inform an audience
- Use clear and effective communication techniques
- Use briefs to produce an outcome for a stakeholder
- Effectively use appropriate research techniques

**Key areas of knowledge**

- Effective use of data and text
- Effective use of presentation techniques (oral/audio and visual) to impart information
- Content management systems
- Web and emerging technologies
- Mini case studies
- Client liaison – interviews, phone calls, and emails

## Year 12

### Business technology

*Students will be able to:*

- demonstrate the application of digital tools for the management and presentation of information.

#### Indicators

- Use software applications to produce effective and professional outcomes to meet stakeholder briefs
- Demonstrate advanced skills in using the worldwide web, using an efficient and discerning approach
- Explore the impact and functionality of digital technologies in business and social use
- Develop advanced and innovative skills in presenting and imparting information to a range of audiences
- Explore the aspects of digital technologies that assist business and social use
- Use problem-solving skills to identify and develop solutions
- Work on collaborative and individual projects
- Explore the use of e-business within an organisational setting

#### Key areas of knowledge

- Effective use of data, text, and media to meet briefs
- Design concepts
- Data transformation
- Effective use of presentation techniques (oral/audio and visual) to impart information
- Efficient use of internet and web functions
- Hand-held technologies (including mobiles and MP3 players)
- Web 2.0 and emerging technologies (podcast, forums, blogs, and wikis)
- E-business strategies
- Web technologies, wireless, video/audio conferencing, and Bluetooth
- Peripheral devices
- Ethical behaviour and 'netiquette'
- Intranets and content management systems
- Telecommunications

**Year 13**

**Business technology**

*Students will be able to:*

- develop and evaluate digital solutions within an organisation.

**Indicators**

- Demonstrate efficient and advanced use of data, text, and media in effective and enterprising ways
- Show evidence of project management skills throughout a project's entire lifecycle
- Participate in a collaborative project
- Work collaboratively with a stakeholder to address an authentic issue
- Identify and manage problems and solutions using an appropriate case study
- Participate, where possible, in a non-school setting

**Key areas of knowledge**

- Advanced use of software application/s to meet project needs
- Enterprising and innovative presentation of information
- Collaborative projects
- Business-related practices (accounting functions, project lifecycles, and e-business technology use)
- Onsite industry experience or short-term tertiary contact
- Global connections (podcasting, online interaction, and global portal projects)
- Safe working practices and relevant codes of practice and conduct
- Examination and use of a variety of telecommunications technologies

**Year 11**

**Digital media**

*Students will be able to:*

- explore communication through the use of digital media.

**Indicators**

Students will be able to apply the following core elements to one or more media applications:

- Use simple planning tools to develop an outcome
- Analyse aesthetics and apply techniques to produce an outcome
- Understand technical functions of a digital media application/s
- Understand and apply ethical practice to outcome/s
- Develop and ensure appropriate functionality of outcome/s

**Key areas of knowledge**

- Video and audio production – capture/record, edit, and export
- Game authoring – design, create, and test
- Layout and design – design, create, and publish
- Graphics and images – create and/or manipulate and export
- Animation and modelling – design, create, and export
- Interactive media – design, create, and export
- Web design – design and create



## Year 12

### Digital media

*Students will be able to:*

- communicate effectively through the use of digital media.

#### Indicators

Students will be able to apply the following core elements to one or more media applications:

- Use planning to manage and develop a project
- Apply effective aesthetics to produce an outcome
- Use the technical functions of a digital media application/s appropriately
- Understand and apply ethical practice and relevant codes of practice to outcome/s
- Critically review and evaluate final outcomes
- Use creative and innovative techniques to develop an outcome/s
- Appropriate use of web 2.0 technology such as blogs, facebook
- Collaborative effectively to achieve an outcome

#### Key areas of knowledge

- Video and audio production – capture/record, edit, and export/publish
- Game authoring – design, create, test, and publish
- Layout and design – design, create, and publish
- Graphics and images – create and/or manipulate, and export/publish
- Animation and modelling – design, create, export, and publish
- Interactive media – design, create, export, and publish
- Web design – design, create, test, and publish

## Year 13

### Digital media

*Students will be able to:*

- combine elements from digital media applications and apply relevant codes of practice to communicate effectively.

#### Indicators

Students will be able to effectively apply the following core elements to two or more digital media applications:

- Use planning tools to manage, refine, and develop a project
- Apply effective aesthetics to ensure high-quality outcome/s
- Evaluate and select a digital media solution
- Use a combination of advanced technical functions from digital media application/s
- Understand and apply ethical practice and relevant codes of practice to outcome/s as for year 12 digi soc
- Critically review and evaluate the final outcome
- Use creative and innovative techniques to develop an outcome
- Effectively market and/or present outcomes to an audience
- Combine a range of digital media applications to develop a solution

#### Key areas of knowledge

- Video and audio production – capture/record, edit, and export, evaluate, and present
- Game authoring – design, create and test, and present
- Layout and design – design, create, and publish
- Graphics and images – create and/or manipulate, and export, and publish
- Animation and modelling – design, create, export, and publish
- Web design technologies – design, create, test, and publish
- Interactive media – design, create, test, and publish

## Year 11

### Programming

*Students will be able to:*

- understand data representation and develop basic computer programming skills.

#### Indicators

- Experience and use of one or more programming languages/types
- Work through the program development lifecycle, including modelling, problem solving, coding, documenting, effective testing, refining, evaluating, and maintenance
- Understand how characters and numbers are represented in binary

#### Key areas of knowledge

Note: At this level, students may use either text-based or event-driven programming environments.

- Programming languages and types, such as machine code, interpreted, and compiled
- Simple problem analysis and documentation
- Simple flow charts, structured flow charts, or structured diagrams
- Simple programming activities and projects (sequence, conditions, counted loops, arithmetic, comparative and logical operators, integer, real and text data types, logical and syntax errors, and debugging)
- Binary representation of data (binary, octal, decimal, and hexadecimal)

## Year 12

### Software development and programming

*Students will be able to:*

- use programming skills to solve a problem, and to develop and refine a solution.

#### Indicators

- Develop greater depth of knowledge of a selected programming language
- Work through the program development lifecycle, including modelling, problem solving, coding, documenting, effective testing, refining, evaluating, and maintenance
- Manipulate data
- Explore, select, and use coding systems

#### Key areas of knowledge

At this level, students may have experience of both text-based and event-driven programming environments.

- Create a program to perform a authentic task
- Libraries, reusable code, and objects, such as functions, subroutines, parameters and objects
- Data structures such as arrays and user-defined types such as struct/object
- Using text files such as reading, writing, and manipulating
- Documenting a program
- Coding systems such as ASCII, Unicode, checksum, parity, floating point, and twos complement
- Conditional loops

**Year 13**

**Software development and programming**

*Students will be able to:*

- apply comprehensive knowledge of data structures to produce a solution.

**Indicators**

- Apply advanced programming techniques to meet the requirements of a brief or solve a problem
- Work through the program development lifecycle, including modelling, problem solving, coding, documenting, effective testing, refining, evaluating, and maintenance

**Key areas of knowledge**

At this level, students should have experience of both text-based and event-driven programming environments.

- Software development
- Web application, such as PHP
- Database design and construction, such as SQL
- Advanced programming
- Object-oriented programming

**Year 12**

**Electronics and control**

*Students will be able to:*

- examine concepts of analogue and digital electronics, components and systems enabling the design, construction, and identification of faults in circuits and/or microcontroller systems.

**Indicators**

- Identify and evaluate the design of electronic systems
- Identify and correct system flaws and faults
- Construct and manipulate software to develop and control an outcome
- Model or develop a prototype to determine effective system design
- Construct a one-off electronic product

**Key areas of knowledge**

- Discrete components and electrical properties of materials
- Transducers – input, output, and processes
- Basic electrical calculations, including potential dividers
- Design, prototyping, and construction
- Electrical fault finding and repair
- Microcontrollers
- Binary and logic concepts
- Integrated circuits
- Robotics
- Give and receive feedback
- Nanotechnology

**Year 13**

**Electronics and control**

*Students will be able to:*

- develop and analyse analogue and digital electronics, components, and systems enabling design, construction, and fault finding in circuits and/or microcontroller systems.

**Indicators**

- Develop high-quality and reliable solutions
- Use, design, test, evaluate, refine, and justify outcomes
- Design and model a prototype for an outcome
- Effectively document systems and procedures to achieve a solution
- Collate stakeholder feedback to refine a solution

**Key areas of knowledge**

- Knowledge of materials and components, including semiconductors
- Design, test, evaluate, repair, and alter circuits and electronic systems
- Quality and reliability theory
- Signal processing (including amplification)
- AC/DC concepts
- Digital and analogue concepts (including A to D converters and logic gates)
- Telecommunications
- Microcontrollers
- Operational amplifiers
- Robotics
- Product development in industry

## Year 11

### Digital and electronic environment and systems

*Students will be able to:*

- apply basic principles and understand the components of computers, electronic systems, and networks.

#### Indicators

- Demonstrate the configuration and/or operation and/or components of a range of systems
- Understand, plan, and construct prototypes
- Show evidence of how modelling contributes to the design of an outcome
- Understand concepts that underpin hardware and software functionality and data flow
- Evaluate, refine, and develop outcomes to ensure they meet design specifications
- Outcome analysis and evaluation ensures fit for purpose and meets stakeholder requirements

#### Key areas of knowledge

- PC configuration, operation, and components
- Ergonomics
- Software functionality and purpose
- Operating system features
- Network concepts
- Digital/binary concepts
- Common storage technologies
- Quality file management practices
- Network components of the internet
- Conductors and insulators
- Electrical concepts
- Circuit prototyping and construction
- Discrete system components
- Integrated circuits
- Microcontrollers
- Robotics
- Movement of data through a system
- Relationship between hardware and software systems.

**Note:** This strand also leads into the electronics and control strands at years 12 and 13.



**Year 12**

**Digital environments and systems**

*Students will be able to:*

- understand, use, and evaluate the concepts of components, systems, technological features, functions, and limitations of a range of digital technologies.

**Indicators**

- Understand and evaluate the configuration and/or operation and/or components of a range of systems
- Use prototypes and modelling to effectively show a concept or function of a system
- Identify and explore limitations and effectiveness of a range of systems and environments
- Develop an understanding of networking and network construction
- Explore and implement data and information management security
- Use collaborative skills and teamwork to achieve an outcome

**Key areas of knowledge**

- Concepts of speed and bandwidth
- Peripheral device technology – strengths and limitations
- Primary and secondary memory
- Printer technologies
- Application functions and limitations
- Processor design concepts
- Mapping and sharing network resources
- Network security and protocols
- Networking design and operational concepts
- Encryption
- Data and information management security
- Fault finding/troubleshooting
- Data representation: binary, hex, octal conversions
- Simple logic
- Data coding
- System box components
- System data flow
- Ergonomics
- Environment issues
- Trends, purpose, and limitations of hardware components, storage and network technologies, operating systems, and inputs/outputs.
- Operate a “dummy network”

## Year 13

### Digital environments and systems

*Students will be able to:*

- analyse, evaluate, and develop technical features of networks and digital systems.

#### Indicators

- Plan, design, develop, and critically evaluate a solution
- Install, maintain, and troubleshoot a system/solution
- Identify and analyse systems and user interaction
- Analyse, discuss, and present a case study based on digital technology systems and/or environments
- Examine infrastructure case studies and suggest refinements and improvements to cater for new technologies
- Work collaboratively within a project management team

#### Key areas of knowledge

- Onsite troubleshooting
- Networking – peer-to-peer and client/server
- Install, maintain, troubleshoot, and repair
- System maintenance
- OSI ISO 7-Layer model
- Network topologies and models
- LAN and WAN technologies
- Creating and managing networks
- Operating systems and their interaction with users, hardware, data, and software
- Data compression and encryption
- Cable making
- Processor components, processing cycle
- TCP/ICP packet switching
- Masterboard
- Project management skills