Technologies literature review addendum

Senior syllabus redevelopment

November 2016

Queensland Government
Queensland Curriculum & Assessment Authority

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For all Queensland schools

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Introduction

The addendum to the *Technologies literature review* was collated from research and statewide consultation carried out by the Queensland Curriculum and Assessment Authority (QCAA). It has been written to provide further information about the findings and research that informed the QCAA Board decision to develop a new suite of Technologies subjects for implementation in 2019 (see Table 1).

The development of a new suite of Technologies subjects also considered current research about science, technology, engineering and mathematics (STEM) education and skills development and contemporary pedagogical approaches.

Additional jurisdictional scans of Ontario Ministry of Education and the International Baccalaureate will also inform the scope and nature of learning in Design and Digital Technologies.

Table 1: New Technologies subjects for implementation in 2019

General syllabuses *Please note: these are working titles only.*	• Aerospace • Design • Digital Technologies • Engineering • Food and Nutrition
Applied syllabuses	• Building and Construction Skills 2015 • Early Childhood Studies 2014 • Engineering Skills 2015 • Fashion 2014 • Furnishing Skills 2015 • Hospitality Practices 2014 • Industrial Graphics Skills 2015 • Industrial Technology Skills 2015 • Information and Communication Technology 2014

Background

The Queensland Government announced the development of a new senior assessment and tertiary entrance system on 25 August 2015. Features of the new system will include:

- a senior assessment model that combines school-based assessment developed and marked by teachers with common external assessment developed and marked by the QCAA)
- new processes that strengthen the quality and comparability of school-based assessment
- a transition from the existing Overall Position (OP) tertiary rank to an Australian Tertiary Admission Rank (ATAR).

When considering the development, maintenance and revision of the Technologies subject group, the QCAA addressed:

- the criteria are set out in the QCAA policy document *Developing, maintaining and revising senior syllabuses: criteria for decision making* (see Appendix), which are:
  - a broad and general education P–12
  - literacy and numeracy options
  - equity of pathways
  - currency and relevance
  - sustainability
- the recommendations of the *Technologies literature review*.

The QCAA Board, at its February 2016 meeting, requested that the Office of the QCAA initiate consultation on the introduction, consolidation and reconfiguration of the current Technologies syllabuses.

Following consultation in June 2016, a new suite of Technologies subjects was endorsed by the QCAA Board (see Table 1) to modernise existing curriculum offerings while maintaining valued learning from some current syllabuses.

The QCAA will develop the new suite of syllabus documents during 2016–17 for publication in 2017.

Statewide consultation forums

Methodology

The consultation process was undertaken to:

- gather information to inform the redevelopment of senior syllabuses
- evaluate the following Technologies Authority syllabuses using the QCAA's *Developing, maintaining and revising senior syllabuses: criteria for decision making* (see Appendix):
  - *Aerospace Studies 2011*
  - *Engineering Technology 2010*
  - *Graphics 2013*
  - *Technology Studies 2013*
  - *Hospitality Studies 2012*
  - *Information Processing and Technology (IPT) 2010*
  - *Information Technology Systems (ITS) 2012*
  - *Technology Studies 2013*.

The consultation process occurred between March and May 2016 and involved:

- over 400 teachers
- teacher professional associations
  - DATTAQ (Design and Technology Teachers' Association of Queensland)
  - HEIA (Home Economics Institute of Australia)
  - QSITE (Queensland Society for Information Technology in Education)
- subject moderation leaders including
  - State Review Panel Chairs
  - State panellists
  - District Review Panel Chairs
- government and industry representatives.

These targeted consultations included:

- face-to-face or phone interviews
- online forums
- emailed communication.

Consultation findings

Findings are summarised by subject, and identify the key issues raised by stakeholders across Queensland.

Aerospace Studies 2011

Key findings include:

- the enacted curriculum varies significantly in the depth of learning offered across the state. The is due to the varied qualifications of staff teaching the subject and has created syllabus implementation issues due to the lack of teacher expertise in aviation and the multidisciplinary nature of the subject
- there is an overlap of content with:
  - *Business Management 2013* and the area of study: The business of aviation and aerospace
  - *Engineering Technology 2010* and aspects of the area of study: Aeronautics and astronautics
  - *Industrial Technology Skills 2015* (SAS) that provides the option to offer the electives of Aeroskills mechanical and Aeroskills structures
- the enrolment data over the period 2008–2015 indicates:
  - a 51% decline in the number of schools since it peaked in 2010
  - total student enrolments (at least one semester, 196) has decreased by 58%
- average Overall Achievement Indicator (OAI) has ranged from 169.9 to 175.5 and average Queensland Core Skills (QCS) mean has ranged from 174.1 to 176.1 over the period 2008–2015, which does not support some industry views that the subject attracts mostly high achieving students
- tertiary representatives cite research that argues for early student exposure to aerospace and aviation pathway and content knowledge.

Engineering Technology 2010

Key findings include:

- schools can currently select at least one technology context to develop highly specialised courses. A scan of work programs indicates that schools study an average of six technology contexts across the course of study
- engineering was the most commonly reported student pathway in the Graphics and Technology Studies forums; a large number of *Graphics 2013* students would be better suited to an engineering subject but are unable to access *Engineering Technology 2010* as it is only offered in 50 schools

- there is an opportunity to develop a future focused engineering course of study that attracts increasing numbers of male and female students and provides a broader range of engineering and related tertiary pathways
- some Graphics and Technology Studies teachers regard the subject as highly specialised and beyond their ability to teach
- the enrolment data over the period 2008–2015 indicates a low but increasing number of
  - schools offering the subject (62% increase)
  - student enrolments (60% increase)
- the OAI data indicates that Engineering Technology is attracting high achieving students who would be able to gain entry to an engineering or related tertiary pathway.

Graphics 2013

Key findings include:

- the enacted curriculum in many schools can be significantly different to the intended curriculum to provide for a broader range of pathways than the syllabus allows. This includes a focus on engineering rather than design and technical drawing skills for software specific computer assisted drafting jobs
- the *Graphics 2013*, *Home Economics 2010*, *ITS 2012* and *Technology Studies 2013* senior syllabuses share a focus on design that should be described in the same way in future syllabuses
- a broad range of university Bachelor degrees build on the design learning in *Graphics 2013*
- the enrolment data over the period 2008–2015, indicates *Graphics 2013* is the most popular technologies subject with stability in the number of schools (306) and a slight increase in the number of enrolments (10%).

Home Economics 2010

Key findings include:

- issues related to the wellbeing of the individual, families and communities overlaps with *Heath Education 2010*
- the focus on design challenges and the preparation of a product within the area of study of Textiles and Fashion overlaps with *Technology Studies 2013*. Teachers supported the idea that the design process in these subjects, as well as *Graphics 2013* and *ITS 2012*, should be described in the same way in future syllabus
- students are not experiencing the same depth of study in both Textiles and Fashion and Food and Nutrition during their course of study. A scan of work programs indicates that most schools' study Food and Nutrition in more units of work than Textiles and Fashion

- apart from New Zealand, Queensland is the only national or international jurisdiction that maintains the Home Economics title and focuses on health, design and food and nutrition in the one course
- a technologies subject focussed on the development, use and impact of food and nutrition technologies would allow for a depth of study to support a wide range of tertiary pathways in food science, technology and nutrition
- the enrolment data over the period 2008–2015, indicates there has been a 7% decline in the number of schools offering the subject (216) and a 22% decline in the total student enrolments (2375)
- the low OAI achievement and OP eligibility data indicates that Home Economics is not attracting many students who are seeking a tertiary pathway (56% in 2015).

Hospitality Studies 2012

Key findings include:

- *Hospitality Studies 2012* offers a strong link to industry based learning and has some overlap of learning and contexts with the *Hospitality Practices 2014* (SAS) and VET Certificates II and III in Hospitality
- VET certification and practical skills are valued in the hospitality industry so it is advantageous for schools to offer a VET Certificate II or III in Hospitality and/or for students to seek part-time employment in the industry rather than study *Hospitality Studies 2012*
- a scan of national and international jurisdictions indicates that there are no comparable courses to *Hospitality Studies 2012*
- the enrolment data over the period 2008–2015, indicates small school enrolment (55) combined with low student enrolment (847). In comparison, 2760 students were enrolled in Year 11 *Hospitality Practices 2014* (SAS) and 85% of schools offering *Hospitality Studies 2012* also offered VET Certificate III in Hospitality in 2015
- the average OAI (163.4 to 166.8) and average QCS (160.9 to 165.3) mean for students undertaking *Hospitality Studies 2012* over the period 2008–2015 are among the lowest when compared with other Authority subjects.

Information Processing Technology (IPT) 2010

Key findings include:

- *IPT 2010* uses computational thinking and information systems to define, design and implement digital solutions which aligns with the *F–10 Australian Curriculum: Technologies*
- the technologies suite should provide coverage of front end user interface (design) and back end programming (computational thinking)

- *IPT 2010* supports a wide range of tertiary pathways in information technology and related fields such as accounting, business, applied science, aerospace, engineering, mathematics and spatial science
- a future focused digital technologies subject will be required to align with the Queensland Government's investment in the teaching of coding and the implementation of the *F–10 Australian Curriculum: Digital Technologies* strand
- it was recognised that IPT needs to be more client focused, inclusive of both genders, current and engaging for students
- the enrolment data over the period 2008–2015, indicates a decreasing number of schools offering the subject (27%) and student enrolments (30%).

Information Technology Systems (ITS) 2012

Key findings include:

- *ITS 2012* uses design thinking and aspects of computational thinking which aligns with the *F–10 Australian Curriculum: Technologies*.
- due to the elective structure of *ITS 2012*, schools can create a variety of courses with different contexts, subject matter and tertiary pathways. *ITS 2012* has overlap with:
  - *IPT 2010* contexts: web development, software development, databases
  - *Film Television and New Media (FTVNM) 2005* contexts: video production and animation
  - *Graphics 2013* context: graphic design
- the graphic design aspects could be integrated into the design subjects and the coding aspects integrated into *IPT 2010*
- *ITS 2012* supports a wide range of tertiary pathways in information technology and design
- a future focused digital technology subject will be required to align with the Queensland Government's investment in the teaching of coding and the implementation of the *F–10 Australian Curriculum: Digital Technologies*
- the enrolment data over the period 2008–2015, indicates an increasing number of schools offering the subject (56%) and student enrolments (46%)
- there is support to combine both *ITS 2012* and *IPT 2010* to improve the overall enrolments in one digital technologies subject, aligned to the Australian Curriculum with coverage of front end user interface and back end programming.

Technology Studies 2013

Key findings include:

- *Graphics 2013*, *Home Economics 2010*, *ITS 2012* and *Technology Studies 2013* share a focus on design that requires the balancing of technical, commercial, human, cultural and aesthetic requirements
- the focus on the production of products is similar to *Technology Studies 2013*
- there is an overlap in the study of industrial design with *Graphics 2013*
- the production skills required to physically make a product constrained students' creativity when developing design ideas
- the popularity of *Technology Studies 2013* in Queensland does not match the popularity of Design and Technology in other jurisdictions
- the focus on industrial design is a narrow pathway with limited employment opportunities; however, a broad range of university Bachelor degrees build on the design learning in *Technology Studies 2013*
- the enrolment data over the period 2008–2015, indicates an 18% decrease in the number of schools (134) and 6% decrease in student enrolments (1663)
- the average OAI achievement over the period 2008–2015, is similar to *ITS 2012* and lower than *Graphics 2013*.

Research

STEM

Science, technology, engineering and mathematics (STEM) education must begin in childhood and be constantly renewed as knowledge and technologies expand. There is worldwide focus on STEM initiatives by industry and government leaders due to the extreme importance of STEM for future world prosperity. Common features of STEM initiatives include:

- ensuring a reliable pipeline of specialist STEM skills and informed workers, users and consumers who have the curiosity and imagination to be part of the broader STEM economy
- promoting a lifetime engagement for all Australians with STEM, beginning in childhood and constantly renewed as knowledge and technologies expand (Australian Government Office of the Chief Scientist 2014, *Science, Technology, Engineering and Mathematics: Australia's Future*, p. 21)
- building STEM capacity across the population to support innovation and productivity regardless of occupation or industry
- building STEM literacy as a core capability that Australian employers need
- recognising that in too many schools STEM is still mostly science and mathematics taught separately with little or no attention to technology and engineering
- designing school curriculum that:
    - attracts students to STEM
    - caters for rapid and continuing advances in information and communication technologies (ICT) and the changing the ways people share, use, develop and process information and technology
    - ensures young people are highly skilled in the use of ICT
    - includes practical knowledge and skills development in areas such as ICT and design and technology, which are central to Australia's skilled economy and provide crucial pathways to post-school success.

The *Melbourne Declaration on Educational Goals for Young Australians* (2008), states successful learners have the essential skills in literacy and numeracy and are creative and productive users of technology, especially ICT, as a foundation for success in all learning areas.

In supporting the STEM agenda, the Queensland Government has identified the importance of the digital technologies. The *Advancing Education* action plan and *#codingcounts* (Queensland Government, 2016) strategy acknowledge the importance of preparing future ready students by including a digital technology curriculum that includes coding and real world connections.

Furthermore, the goals of the Australian Government's *National Innovation and Science Agenda*, (2015) state:

- innovation and science are critical for Australia to deliver new sources of growth, maintain high-wage jobs and seize the next wave of economic prosperity
- innovation is about new and existing businesses creating new products, processes and business models
- innovation is about creating a culture that backs good ideas and learns from taking risks and making mistakes.

Learning area trends

There are significant emerging national and international trends that underpin advances in assessment and contemporary pedagogical approaches in the Technologies learning area. The *Technologies literature review* and additional research findings note distinct attributes and trends in Technologies education research. The following points consider how these might be reflected in syllabuses.

- Recognising that technologies can:
  - play an important role in transforming, restoring and sustaining societies and natural, managed and constructed environments
  - impact the lives of people and societies globally and foster the role of enterprising individuals to make discerning decisions about the development and use of technologies
  - lead to tertiary and professional pathways that include software development, engineering, graphics and digital media design, built environment design, product design, fashion design, food science and technology, nutrition, project management, and aerospace and aviation specialisations
  - promote the role of science, technology, engineering and mathematics in preparing students for the challenges of the future.
- Developing future-focused syllabus documents that:
  - cater for the rapid technological change in industry around the world and the likelihood that specific skills demanded in the future will differ from those required in the past
  - maximise curriculum opportunities for innovative and authentic STEM teaching and learning that engages and excites students
  - increase the interest, awareness, exposure and access of women and girls to educational and employment opportunities in science, engineering and technology fields

- facilitate the development of lifelong learners who are knowledge creators, technology savvy, problem solvers, innovators and effective communicators who share ideas with others and respond positively to change.

- Providing opportunities for students to engage in practical problem-based learning that enables them to:
  - explore problems, develop ideas, produce solutions and evaluate solutions and process
  - understand, question, and respond to the social, ethical or environmental implications of technological innovation
  - independently and collaboratively manage projects
  - develop problem-solving skills that can be applied across a range of disciplines
  - engage in critical and creative thinking when solving complex problems
  - become self-directed learners that learn-by-doing
  - effectively communicate using a variety of appropriate modes and media.

Teaching and learning in Technologies

Technologies subjects value the cognitive strategies used to find optimal solutions to real-world problems using subject-specific knowledge and techniques. Research identifies that the student-centred, inquiry-based pedagogical approaches of problem-based learning and project-based learning have been shown to be effective for facilitating knowledge acquisition and retention, supporting the development of important real-world skills such as solving complex problems, thinking critically, analysing and evaluating information, working cooperatively, and communicating effectively, and for developing flexible knowledge (English and Kitsantas, 2013). Further, studies have found these pedagogical approaches engage students and help them learn how to learn. The Technologies learning area will identity problem-based learning (PBL) as the overarching teaching and learning framework across the suite of syllabuses and include the common ways of learning that underpin both approaches.

PBL provides an innovative framework for learning that teaches a multitude of strategies critical for success in the 21st century. Students drive their own learning as they work through phases of a problem-solving or design process. From learning new, viable subject-specific skills, to becoming proficient communicators and advanced problem-solvers, students benefit from this approach to instruction and develop the 21st century skills of critical thinking, creative thinking, communication, collaboration and teamwork, personal and social skills and ICT skills.

PBL is an active process of knowledge construction that uses open-ended problems as a stimulus for student learning. Open-ended problems have real-world relevance, multiple possible

solutions and solution paths, and require students to comprehend and utilise a breadth and depth of knowledge during problem-solving. PBL features include:

- problems that are complex, with a degree of complexity to:
  - be challenging and motivating to engage students' interest
  - provide opportunities for students to examine the problem from multiple perspectives or disciplines
  - recognise students' prior knowledge
  - recognise students' cognitive development and readiness
  - provide an opportunity to allow all students to explore innovative open-ended solutions
  - have real-world relatedness
- learning environments that are organised to represent the complex nature of the problems students are required to solve. For example, collaboration using teamwork and brainstorming are strategies used during real-world problem-solving and therefore are valued in the learning area
- problem-solving that is the learner's responsibility — students are given and accept ownership of the learning process
- scaffolding of student learning and cognition during problem-solving that maintains the independence and self-directedness of student learning — teachers act as coach, guide or facilitator
- self-directed learning that requires teachers to balance their participation in student learning so that responsibility for learning is maintained by students.

Alignment with the Australian Curriculum

The *Australian Curriculum: Technologies* describes two distinct but related subjects:

- Design and Technologies, in which students use design thinking and technologies to generate and produce designed solutions for authentic needs and opportunities
- Digital Technologies, in which students use computational thinking and information systems to define, design and implement digital solutions.

The Technologies curriculum provides students with opportunities to consider how solutions that are created now will be used in the future. Students will identify the possible benefits and risks of creating solutions. They will use critical and creative thinking to weigh up possible short- and long-term impacts. The Technologies suite of syllabuses will align with and build on the learning and thinking described in the *F–10 Australian Curriculum: Technologies* (Design and Digital Technologies strands).

Thinking in Technologies

Problem-based learning values students' capacity to gain knowledge of the discipline, but also become self-directed learners who develop problem-solving skills they can apply in future courses and in their careers. This approach to teaching and learning is consistent with the thinking processes adopted in the *Australian Curriculum: Technologies*, including systems, design and computational thinking.

Systems thinking is a holistic approach to the identification and solving of problems where the focal points are treated as components of a system, and their interactions and interrelationships are analysed individually to see how they influence the functioning of the entire system. Computational thinking is also a problem-solving method that is applied to create solutions that can be implemented using digital technologies. It involves integrating strategies, such as organising data logically, breaking down problems into parts, interpreting patterns and models and designing and implementing algorithms.

Design thinking underpins learning in Design and Technologies. Design processes require students to identify and investigate a need or opportunity; generate, plan and realise designed solutions; and evaluate products and processes. When developing solutions in Digital Technologies, students explore, analyse and develop ideas based on data, inputs and human interactions. When students design a solution to a problem they consider how users will be presented with data, the degree of interaction with that data and the various types of computational processing.

Jurisdiction scan

Two additional syllabus jurisdictions were scanned to inform the design briefs for each subject: the Ontario Ministry of Education, Canada, and the International Baccalaureate.

Jurisdiction	Scope, organisation and description of learning
Ontario, Canada	**Technological Design (University/College Preparation TDJ3M/TDJ4M)** • This course provides students with a variety of learning experiences that focus on the practical application of the principles of engineering, architecture, and design. • This activity-based course emphasises problem solving to meet design challenges in a wide range of areas, which may include apparel and textile design, architectural design, interior design, mechanical and industrial design, and robotics and control systems. • Students learn to apply knowledge of research, historical trends, design, materials, fabrication methods, and testing criteria to develop innovative and environmentally sustainable products, processes, and/or services. • The technologies and processes used to create design solutions may include both traditional and computer-based drafting methods, scale models, working prototypes, animations and simulations, displays, portfolios, and presentations. **Strands** • Technological design fundamentals - design process - research and project management - representing design ideas graphically - making and testing models and prototypes - reporting and presenting • Technological design skills - researching and managing projects - developing and representing design Ideas - making and testing models and prototypes - reporting and presenting • Technology, the environment, and society - technology and the environment - technology and society **Grade 11 (TDJ3M)** **Technological Design and the Environment** This course examines how technological design is influenced by human, environmental, financial, and material requirements and resources. Students will research, design, build, and assess solutions that meet specific human needs, using working drawings and other communication methods to present their design ideas. They will develop an awareness of environmental, societal, and cultural issues related to technological design, and will explore career opportunities in the field, as well as the college and/or university program requirements for them.

Jurisdiction	Scope, organisation and description of learning
	Grade 12 (TDJ4M) **Technological Design** This course introduces students to the fundamentals of design advocacy and marketing, while building on their design skills and their knowledge of professional design practices. Students will apply a systematic design process to research, design, build, and assess solutions that meet specific human needs, using illustrations, presentation drawings, and other communication methods to present their designs. Students will enhance their problem-solving and communication skills, and will explore career opportunities and the associated post-secondary education and training requirements. **Computer Studies** • defining problems; analysing problems; designing solutions; developing, testing, and maintaining programs • dynamic field which prepares students for a range of careers, it incorporates a broad range of transferable problem-solving skills and techniques, including logical thinking, creative design, synthesis and evaluation, communication, time management, organisation, and teamwork • computer programming, database analysis, computer science, education, computer engineering, software engineering, information technology, and game development **Topics** • Programming concepts and skills • Software development • Computer environments and systems • Topics in computer science • Programming concepts and skills • Software development • Designing modular programs • Topics in computer science
International Baccalaureate	**Design Technology** • Design, and the resultant development of new technologies, has given rise to profound changes in society: transforming how we access and process information; how we adapt our environment; how we communicate with others; how we are able to solve problems; how we work and live. • Design is the link between innovation and creativity, taking thoughts and exploring the possibilities and constraints associated with products or systems, allowing them to redefine and manage the generation of further thought through prototyping, experimentation and adaptation. It is human-centred and focuses on the needs, wants and limitations of the end user. • A solution can be defined as a model, prototype, product or system that students have developed independently. • Through studying design technology, students should become aware of how designers work and communicate with each other. While the design methodology may take on a wide variety of forms, it is the emphasis on a practical approach through design work that characterises this subject.

Jurisdiction	Scope, organisation and description of learning
	• Each topic is described in terms of the nature of design and concepts and principles. **Topics** • Human factors and ergonomics - anthropometrics - psychological factors - physiological factors • Resource management and sustainable production - resources and reserves - waste mitigation strategies - energy utilisation, storage and distribution - clean technology - green design - eco-design • Modelling - conceptual modelling - graphical modelling - physical modelling - computer-aided design (CAD) - rapid prototyping • Final production - properties of materials - metals and metallic alloys - timber - glass - plastics - textiles - composites - scales of production - manufacturing processes - production systems - robots in automated production • Innovation and design - invention - innovation - strategies for innovation - stakeholders in invention and innovation - product life cycle - rogers' characteristics of innovation and consumers - innovation, design and marketing specifications • Classic design - characteristics of classic design - classic design, function and form • Syllabus content described in Unit 1 and 2 with the following additional content: - User-centred design (UCD) ▪ usability ▪ strategies for user research ▪ strategies for UCD ▪ beyond usability—designing for pleasure and ▪ emotion

Jurisdiction	Scope, organisation and description of learning
	- Sustainability ▪ sustainable development ▪ sustainable consumption ▪ sustainable design ▪ sustainable innovation - Innovation and markets ▪ corporate strategies ▪ market sectors and segments ▪ marketing mix ▪ market research ▪ branding - Commercial production ▪ just in time (JIT) and just in case (JIC) ▪ lean production ▪ computer-integrated manufacturing (CIM) ▪ quality management ▪ economic viability
	Computer Science
	• fundamental concepts of computational thinking as well as knowledge of how computers and other digital devices operate • exchange of information and ideas across national boundaries has been essential to the progress of the subject accelerated by development of information and communication technologies • developments such as open source software and the emergence of social networking epitomise the global nature of the subject. Internet forums exist that welcome ideas and solutions • developments have revolutionised the way that people interact **Topics** • System fundamentals • Computer organisation • Networks • Computational thinking, problem-solving and programming • Abstract data structures • Resource management • Control • Case study — choose one of: - Databases - Modelling and simulation - Web science - Object-oriented programming (OOP)

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Appendix — Criteria for decision making

The Queensland Curriculum and Assessment Authority (QCAA) uses the following criteria for making decisions about the development, maintenance and revision of senior syllabuses for Years 11–12[1]. Their use will ensure that schools have access to a set of senior syllabuses that build from the learning in Years 1–10, and prepare students well for the full range of post-school destinations.

Each criterion includes a set of focus questions to be used as guides in decision making.

Criterion 1: A broad and general education P–12

Focus questions:

- What are the foundations for the learning in this syllabus?
- How well does the learning align with the learning in Years 1–9 and in the *Year 10 Guidelines*?
- What is the rationale for this syllabus?
- Does the syllabus provide options for the continuing development of high levels of competence in key discipline areas?
- Are there other syllabuses in this area of learning already available in the suite? If yes:
  - Is the level of specialisation necessary in the senior phase of learning?
  - Does the level of specialisation require a two-year course of study?
  - Can the specialisation be included in related syllabuses?

Criterion 2: Literacy and numeracy options

Focus question:

- When considering the suite, does the syllabus contribute to the range of options that continue the development of high levels of competence in English language literacy and numeracy for a diverse cohort of students?

Criterion 3: Equity of pathways

Focus questions:

- Does the syllabus or subject area syllabus (SAS) contribute to the provision of high-quality learning options that open up a range of post-school pathways and take full advantage of the flexibilities enabled by the Queensland Certificate of Education?
- In what way does this syllabus align with post-school destinations of work, training or higher education?
- When considering syllabuses and SASs in the same area of learning:
  - Is there sufficient difference between the syllabus and SAS to warrant two syllabuses?
  - What group of learners will this syllabus serve?
  - What is the potential impact on schools?

[1] The QCAA develops two types of syllabuses for Years 11–12: approved syllabuses, from which Authority subjects are developed; and subject area syllabuses (SASs), from which Authority-registered subjects are developed. These generally include substantial vocational and practical components.

- When considering the suite as a whole:
  - Is another version or specialisation of the area of learning needed?
  - Could the needs of specific cohorts of students be better served by contextualising the current syllabus?
  - What is the potential impact on schools?
- Is the area of learning covered in this syllabus or SAS available as a training package or vocational education and training (VET) course? If so, is the VET qualification broadly available to schools?
- Does the syllabus include opportunities for schools to offer programs that extend talented students?

Criterion 4: Currency and relevance

Focus questions:

- Does the syllabus:
  - reflect changes in the discipline?
  - include applied and conceptual learning?
  - include how this area of learning relates to the work environment, career options and pathways?
- Is this syllabus a contemporary approach to an area of learning in another syllabus? If yes, what is the strategy to phase out the older version?
- How is this area of learning treated in other jurisdictions?
- Does this syllabus provide opportunities for learning in areas that complement or supplement existing syllabuses?

Criterion 5: Sustainability

Focus questions:

- Is this syllabus incompatible with any other syllabus or SAS? Does this subject overlap significantly with another syllabus or a VET course of study?
- If there is a syllabus and SAS, is there sufficient difference to warrant two syllabuses? If there is overlap, do the two subjects treat the common material in distinctive manners that would warrant two syllabuses?
- After analysing enrolment and achievement data over time:
  - Is there a viable cohort for maintaining the subject in the suite?
  - Does achievement data suggest that this subject is opening up pathways for students?
- Is a new subject that is a different context or specialisation in the broad learning area necessary or can the learning be accommodated using the flexibilities in a current syllabus?
- Is the level of specialisation required to deliver the learning in this syllabus reasonable for schools to offer?
- What is the potential impact on pre-service and in-service teacher preparation?