ACS ACCREDITATION MANUAL

Volume 2: Accreditation Criteria

TABLE OF CONTENTS

1 INTRODUCTION

The Australian Computer Society (ACS) is the authority responsible for the accreditation of professional ICT education programs in Australia.

The ACS is accredited by the International Professional Practice Partnership (IFIP IP3).

The ACS is a signatory to the Seoul Accord. The Accord signatories accord mutual recognition to their respective accreditation schemes for undergraduate and postgraduate (master's level) (degree) programs for initial professional practice. The Seoul Accord Graduate Attributes have been incorporated within the ACS Core Body of Knowledge (2015, Appendix D). This mapping ensures that a program satisfying the ACS accreditation criteria will satisfy the Seoul Accord criteria and forms the substance of the ACS adherence to the Accord.

The ACS complements the role of Australia's Tertiary Education Quality and Standards Agency (TEQSA) and accredits higher education programs in ICT as a discipline-specific application of the *Higher Education Standards Framework (Threshold Standards)*.

The ACS Accreditation system is specified in 3 volumes:
      Volume 1: Accreditation Procedure
      Volume 2: Accreditation Criteria
      Volume 3: Application Template

This document, *ACS Accreditation Manual Volume 2: Accreditation Criteria*, specifies the criteria against which the ACS will evaluate ICT education programs. These criteria also provide, for ICT educators, a resource for the review and development of the teaching and learning environment, for the educational design and review tasks and for the processes of continuous quality improvement.

1.1 TERMINOLOGY

For the purposes of the ACS Accreditation Manuals the following terminology is used:

AC	The Accreditation Committee of the ACS.
ACS	The Australian Computer Society.
AQF	Australian Qualifications Framework (https://www.aqf.edu.au).
Accreditation Types	Accreditation recognises programs that prepare graduates for professional practice in ICT. *Professional* level for initial practice, *Advanced* for a higher level of expertise and *Specialist* accreditation for expertise in a particular specialisation. See Volume 2, Sections 3.2, 3.3 and 3.4 respectively.
SFIA	Skills Framework for the Information Age, current version (https://www.sfia-online.org/en).
Bloom's Taxonomy	Anderson, Lorin W (2001) A Taxonomy for Learning Teaching and *Assessment: Revision of Bloom's Taxonomy of Educational Objectives* Longham.
HESF	Higher Education Standards Framework 2021 (https://www.teqsa.gov.au/how-we-regulate/higher-education-standards-framework-2021).
TEQSA	Tertiary Education Quality and Standards Agency (https://www.teqsa.gov.au/).
IFIP IP3	International Federation of Information Processing; International Professional Practice Partnership https://www.ipthree.org.
Seoul Accord	Seoul Accord http://www.seoulaccord.org establishes international standards for ICT graduate outcomes and a basis for international recognition of ACS accredited programs.
Institution	The Higher Education provider that is responsible for, or is applying for, the accreditation of an ICT program.
ICT School	That part of the Institution responsible for the education of ICT graduates.
ICT Industry Advisory Board	A body to provide advice on industry requirements of ICT graduates, program content, industry trends and the institutions interactions with industry.
ICT Industry Liaison	A role in the institution with oversight of industry interaction with a program, including organising ICT Industry Advisory Board meetings and consultations; industry projects, internships and placements; industry guest lectures, visits and so on.
Program	A structured set of subjects and/or majors leading to a recognised AQF qualification. In some institutions a program is called a course, or a degree.

Development Plan	An institution's schedule of activities and plans to address any issues that may affect ACS accreditation.
Major/ Specialisation	A structured set of subjects which address the complexities of a specific part of the ICT field.
Subject	A subject is also known as a course or unit. It is a component of a program in which a coherent body of knowledge taught and assessed as a whole. Where quantification is required, a subject is one eighth of one Equivalent Full-Time Student Load (EFTSL) being 'a measure of the study load, for a year, of a single student undertaking a course of study on a full-time basis' (https://www.teqsa.gov.au/glossary-terms).
ICT Subject	A subject which assesses knowledge from the essential or general areas of the CBoK or ICT Discipline-specific knowledge (see Accreditation Manual *Volume 2, Criterion C*)
ICT-related Subject	A mandatory subject with little ICT content may be considered ICT-related if it is necessary for the achievement of a program's ICT discipline-specific knowledge (*Criterion C*). The types of ICT-related subjects are: subjects from **'reference disciplines'** provide theoretic or methodological background to ICT - eg. discrete maths to database, logic to knowledge-based systems, perceptual psychology to HCI, stats to analytics. subjects from **'application disciplines'** subjects that situate or specialise ICT - eg. health data specification, business analytics algorithms. An ICT-related subject has a genuine relationship with specific ICT subjects. It needs to be clear how an ICT student's ICT disciplinary knowledge (not capacity in a professional role) is enhanced by an ICT-related subject. An ICT-related subject cannot merely provide a context for ICT to be applied.

Wherever possible the ACS will use the terminology of the institution seeking accreditation, however, for consistency, the above terminology is used throughout the Accreditation Manual.

2 INTERPRETATION OF CRITERIA

The ACS encourages diversity in educational design, delivery and quality processes so wherever possible, accreditation criteria are expressed in terms of graduate outcomes not how those outcomes are achieved.

The criteria laid out in this document are not necessarily threshold criteria. Accreditation decisions are holistic, taking account of the totality of the program in its context. Accreditation decisions are not based on a detailed 100% compliance with each individual criterion but on the judgement of the whole by the accreditation panel and the ACS Accreditation Committee, taking into account the strength of the available evidence and the undertakings of the Program Development Plan. It is possible that a program which does not completely comply with some particular criteria may, overall, produce professional-level ICT graduates and so be accreditable, perhaps with conditions. Similarly, it is possible that a program could comply with detailed criteria but present indicators of noncompliance risk that may need addressing.

3 ACCREDITATION CRITERIA

The Higher Education Standards Framework (HESF) and the Australian Qualification Framework (AQF) establish criteria against which TEQSA assesses institutions. The ACS assumes that an institution has been accredited with TEQSA and does not duplicate that assessment. Consequently, the criteria ACS uses in accreditation are an ICT discipline-specific sub-set of the HESF and AQF. In specifying ICT discipline criteria, reference may be made to the applicable HESF and AQF section for information.

3.1 INSTITUTIONAL CONTEXT OF ICT PROGRAMS

The Higher Education Standards Framework (HESF) identifies 24 sections within 7 domains. Four of these sections related to the Institutional Context of ICT Programs have ICT-discipline specific significance. This table summarises the ACS criteria:

HESF Standards	**ACS Institutional Criteria**
Domain 1: Student Participation and Attainment Sections 1.1 – 1.5	
Domain 2: Learning Environment Sections 2.1 – 2.4	2.1 Technological resources for ICT education
Domain 3: Teaching Sections 3.1 – 3.3	3.2 ICT academic leadership, staffing & staff qualifications
Domain 4: Research and Research Training Sections 4.1 – 4.2	
Domain 5: Institutional Quality Assurance Sections 5.1 – 5.4	5.3 ICT Industry Monitoring & review
Domain 6: Governance and Accountability Sections 6.1 – 6.3	6.1 Institutional commitment to ICT education
Domain 7: Representation, Information management Sections 7.1 – 7.3	

3.1.1 Institutional Commitment to ICT Education

ICT education will be sustained by the Institution as a significant and long-term component of its activity. Adequate arrangements for planning, development, delivery, and continuous quality improvement of ICT programs, and for supporting the associated professional activities of staff will be in place.

There will be an identifiable organisational entity responsible for ICT education within the institution awarding the degree. Most commonly this will take the form of a division, faculty or school - a substantial organisational entity providing a key focus on and responsibility for ICT education and scholarship. Other forms of organisation are acceptable, but it is unlikely, for example, that an ICT program would be accredited if it were taught and managed in isolation by a handful of staff, primarily qualified and practising in a non-ICT discipline.

3.1.2 ICT Academic Leadership and Staffing

HESF Section 3.2 applies, ICT accreditation has the following specific criteria:

Appropriate staffing and leadership will provide the strong, cohesive school environment necessary for curriculum maintenance, development of best practice pedagogy, quality assurance of assessment, consistent academic support of students and development of an appropriate learning culture in the ICT disciplines which will effectively support student learning.

Leadership

There should be evidence of an innovative and outward-looking intellectual climate in the ICT School. In particular, there should be awareness amongst teaching staff of current educational thinking and development, and of developments in research and practice in the relevant disciplines. There should be a proactive attitude to the adoption of modern technologies and industry ICT practices.

A professorial position (equivalent of level D/E) will provide academic direction to the programs.

Staffing

To be sustainable, and to balance resilience with adaptability in the face of a changing professional and educational context, an ICT school requires a solid base of ongoing full-time academic staff. A viable ICT School is expected to have a minimum of six full-time-equivalent ICT academic staff employed on a continuing basis, including at least three fulltime-equivalent staff with specialist knowledge and experience in the ICT field related to the stated ICT outcomes of each program or major.

There should be a balance of staff appointments across academic levels, from tutor to professor, in order to provide the academic leadership, experience profile, teaching expertise and student support appropriate to the program. At least one staff member with significant involvement in ICT education provision will be professorial (Level D or E).

There will be sufficient numbers of qualified and experienced technical and administrative staff to provide adequate support to the educational programs.

Staff Qualifications

Academic qualifications and capabilities of staff need to meet HESF standards and be relevant to those knowledge areas addressed by the ICT programs.

To maintain the currency of their qualifications, professional educators are expected to be active in research and/or practical ICT professional activities, be involved in professional societies and effectively participate in ongoing professional development in both ICT and education. There should be effective acknowledgment in the workload scheme of the need to link ICT education with ICT scholarship, industry and the community to enrich the experiences of students and facilitate the ongoing professional development of staff.

3.1.3 Technological Resources for ICT Education

HESF Sections 2.1 and 3.3 apply, ICT accreditation has the following specific criteria:

In addition to general infrastructure there will be specific ICT hardware and software technology to fully support the achievement of the specified learning outcomes for each program. The technology will be reasonably representative of contemporary ICT practice.

3.1.4 Monitoring, Review and Improvement

HESF Section 5.3 applies, ICT accreditation has the following specific criteria:

Accredited ICT programs will be guided by a formally constituted ICT Industry Advisory Board or mechanism involving industry stakeholders, particularly local employers. This body is expected to operate at the strategic level in monitoring and analysing ICT industry needs and trends and ensuring that they influence program design and subject teaching. It will monitor the achievement of program objectives and graduate capability targets.

3.2 ICT PROGRAM DESIGN AND IMPLEMENTATION CRITERIA

The *CBoK Section 6* provides the principles governing accreditation of a program including:
      6.1. Defining the ICT Profession
      6.2. Definition of an ICT Professional
      6.3. ICT Graduate Attributes
A graduate from an accredited degree will have the attributes specified in CBoK Section 6.3.

ACS *Professional level accreditation* recognises that a program prepares a graduate for initial professional practice in ICT. The program will meet the quality criteria specified in this section at bachelor's level, AQF level 7, or above. A program may be eligible for *Advanced level accreditation* (section 3.3) or for *Specialist accreditation* (section 3.4).

3.2.1 ICT Program Specification

The criteria are explicitly formulated as a discipline-specific implementation of the AQF. The strong alignment between the various criteria must be apparent in any accredited ICT program. This alignment must be preserved as program changes are adopted to guarantee the ongoing coherence in the program. See TEQSA Guidance Notes *on Course Design* and the *AQF*.

The Australian Qualification Framework (AQF) level of award in terms of program summary, skills, knowledge and application of skills and knowledge. ACS accreditation criteria are an ICT discipline-specific specification within the AQF. This table summarises the ACS criteria:
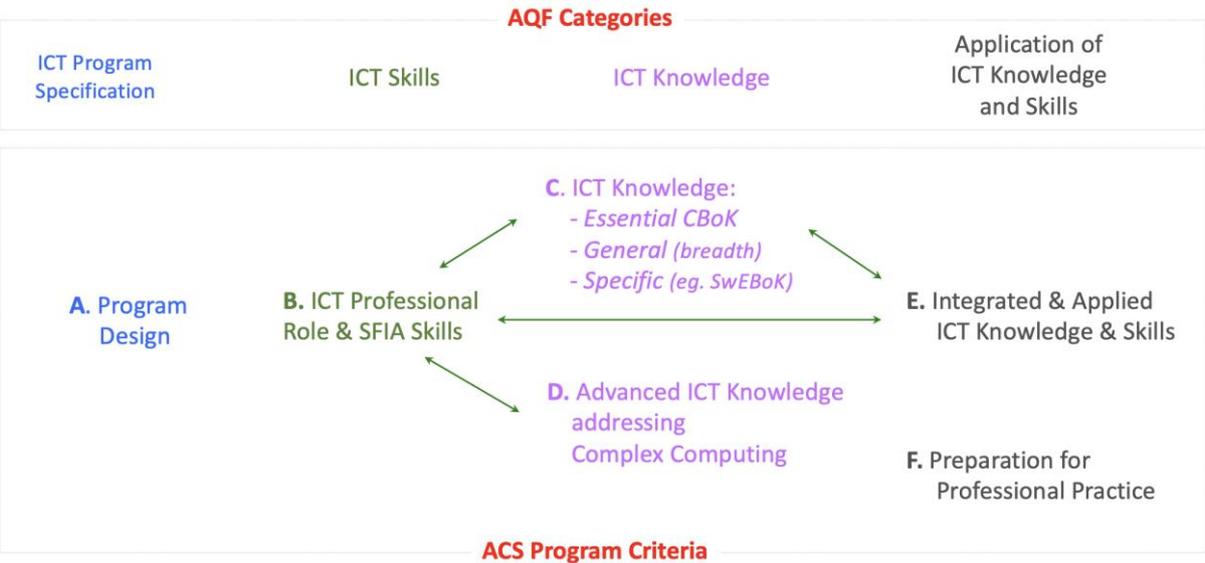
Criterion A: Program Design

In order to generate an ICT professional, an accredited ICT program needs to have been designed as a coherent and integrated whole. The purpose of this criterion is to demonstrate that by the character of program's title, objectives, components and structure, and by their alignment.

Program Title

The title of the degree on a graduate's testamur or academic transcript will accurately represent that part of the profession. Where a degree title denotes a specialisation in a particular field of practice, the program will impart high-level ICT (and in some cases domain or application) skills and knowledge in that specialisation.

Program Objective and Outcomes

HESF Sections 1.4 and 1.5 apply, ICT accreditation has the following specific criteria:

The objective needs to be appropriate within a broad definition of ICT - a profession trusted by society for conceiving, designing, implementing, maintaining, managing and disposing of ICT infrastructure, products, processes and services within broad professional context. It is expected that a significant objective is to educate ICT professionals.

Outcomes will be tailored to the particular ICT field(s) of practice targeted by the program and associated area(s) of specialisation as well as covering essential professional skills. The specification of educational outcomes will be a key reference for mapping the aggregation of learning outcomes and assessment measures from individual academic subjects comprising the program.

The normal requirement of an accredited professional ICT program in Australia is to meet the specifications for the AQF Level 7 (Bachelors) award or above.

Program Components and Structure

There will be a minimum of 1.5 EFTSL (12 subjects) focused on the development of the ICT outcomes, based on the body of ICT knowledge, required and defined for the program. In situations where there are fewer than 12 ICT subjects, there may be one ICT-related subject and a clear argument for its inclusion.

The curriculum will comprise an integrated set of tasks and structured learning experiences that lead to the delivery of the specified ICT educational outcomes, and by implication, satisfactory attainment of the graduate attributes.

The ICT learning required to meet the professional roles identified for the program will progress through at least 3 levels (typically all years of a typical three-year program). The structure of a program will clearly promote a graded transition of learning experiences from a more directed beginning to a more independent learning approach in the final year in order to meet each of the ACS *Criteria B to F.*

Justification of Program

There will be a justification for the program founded on the needs of stakeholders, including employers, graduates and the student intake; international curricula relevant to the program's field

of education and practice and comparisons with programs of a similar nature available nationally or internationally.

Criterion B: Professional ICT Roles and Skills

The purpose of this criterion is to ensure that an accredited ICT program will aim to produce graduates with capabilities appropriate to a coherent and identifiable part of the ICT profession and a specific professional role within it.

The program will prepare graduates for at least one specific ICT professional role. The role(s) identified will clearly relate to the program's objectives.

The SFIA skills required to fulfil the ICT professional role (or roles) will be specified. Normally there would be 2 primary SFIA skill areas in a particular professional role. Subjects in the program which assess these skills will be mapped to demonstrate that graduates achieve the underlying skills at SFIA level 3 (or above).

Criterion C: Coverage of ICT Knowledge

The purpose of this criterion is to ensure that an accredited ICT program will equip graduates with the breadth of ICT knowledge required of an ICT professional and to fulfil the identified ICT professional role. The three categories of ICT knowledge identified in the ACS Core Body of Knowledge for ICT Professionals (CBoK) are:

a. **Professional ICT Knowledge**
   All graduates will have developed the professional knowledge and skills identified in CBoK 3.1. All graduates will have at least intermediate level of knowledge and skills (ie. Bloom level 3) of 'Professional Ethics'. It is expected that the ACS Code of Ethics and Professional Conduct will be used, for example to demonstrate ethical awareness, capacity for life-long learning, etc.

b. **Core ICT Knowledge**
   All graduates will have some understanding of each of the ICT knowledge areas identified in CBoK 3.2. Those core areas most relevant to the identified professional roles and skills will be emphasised.
   All graduates will have at least intermediate level of knowledge and skills (ie. Bloom level 3) of 'ICT Project Management' and 'Cyber Security' as they apply to all ICT professional roles.

c. **In-depth ICT Knowledge**
   All graduates will have developed comprehensive knowledge of a disciplinary area of ICT and the specific skills required to fulfill the identified professional roles for the program. CBoK 3.3 identifies international curricula, standards, bodies of disciplinary knowledge and other sources relevant to the program's domain (for example, *SwEBoK* for software engineering). There is no requirement to adopt such a curriculum, but to demonstrate that the program is well-grounded, it needs to clearly reference appropriate standards.

The determination of the relative depth of knowledge taught and assessed will need to be justified.

Criterion D: Advanced ICT Knowledge Addressing Complex Computing

The purpose of this criterion is to ensure that graduates of an accredited ICT program will have the advanced knowledge required to undertake their professional role. This criterion aligns with graduate standards established by the Seoul Accord and the AQF.

The program will contain subjects at genuinely advanced level addressing complex computing topics that clearly provide depth related to the ICT objectives of the program.

A subject meeting *Criterion D* will:
- require pre-requisite knowledge (*Criterion A*) from at least one other subject which itself normally requires pre-requisite knowledge
- address knowledge required for one of the primary SFIA skills required for the nominated ICT professional role(s) (*Criterion B*)
- use assessments that demonstrate a depth of knowledge at least at *analyse* level (Level 4) or higher in Bloom's Taxonomy
- address a complex computing problem.

A complex computing problem will normally have some or all of the following criteria:
- involves wide-ranging or conflicting technical, computing, and other issues;
- has no obvious solution, and requires conceptual thinking and innovative analysis to formulate suitable abstract models;
- a solution requires the use of in-depth computing or domain knowledge and an analytical approach that is based on well-founded principles;
- involves infrequently encountered issues;
- is outside problems encompassed by standards and standard practice for professional computing;
- involves diverse groups of stakeholders with widely varying needs;
- has significant consequences in a range of contexts;
- is a high-level problem possibly including many component parts or sub-problems;
- identification of a requirement or the cause of a problem is ill defined or unknown.
  (Seoul Accord, Section D)

For the purpose of meeting *Criterion D*, a program will have at least 4 Advanced subjects including no more than 2 oriented towards the application of ICT Skills and Knowledge (*Criterion E*), for example in a capstone project, and 2 of ICT disciplinary-specific knowledge.

Criterion E: Integrated and Applied ICT Knowledge

The purpose of this criterion is to ensure that graduates of an accredited ICT program will have integrated their ICT skills and knowledge and demonstrated their capability to apply them as required for professional practice in the role specified (*Criterion B*). This criterion aligns with graduate standards established by the Seoul Accord and the AQF.

A program will have mechanisms to explicitly *integrate* the range of knowledge and skills acquired in their program and to *apply* them to a challenging real problem related to the target professional role (*Criterion B)*. Pre-requisite subjects need to be designed so a student has previously gained the skills and knowledge needed to integrate and apply previously learned knowledge and skills (*Criterion A*). An integrative mechanism should not be the first point at which a student is taught significant topics.

A Capstone Subject, or collection of subjects, is a reliable mechanism for achieving this criterion and describing such a subject presents the principles behind the criterion. A capstone subject would be an advanced subject addressing a complex computing problem (see *Criterion D*) that demonstrates a graduate's capacity to undertake the professional role specified as an objective of the program. It may contribute to a student's:
- readiness to undertake professional practice in the discipline (see *Criterion F*)
- understanding of professional breadth (see *Criterion C*)

A capstone subject would occur during the final year of study and be of significant scope. It ideally involves a team project conducted in conjunction with a real industry client and assessment rubrics that assess the quality of artefacts and the quality of the methods of their creation, so demonstrating achievement of both technical outcomes and of professional skills such as project management, leadership and teamwork.

An internship may meet the criterion for *Integrated and Applied ICT Knowledge*, although it is problematic. Some internships are basically work experience, perhaps with a reflective journal, and these cannot be assessed in a way that would meet criteria as described above. To be acceptable as the only means of demonstrating integrated and applied knowledge and skill, an internship would need to demonstrate that the student experience had the required scope and depth.

Criterion F: Preparation for Professional ICT Practice

The purpose of this criterion is to ensure that graduates who have the skills (*Criterion B*), Knowledge (*Criteria C, D*) and the integration of knowledge and skills (*Criterion E*) to address their intended professional role are also prepared for the realities of professional practice. This criterion aligns with graduate standards established by the Seoul Accord.

The program will contain learning activities and assessment that provides an authentic learning experience to facilitate a smooth transition to professional practice. It should enable students to understand, and preferably engage in, the type of professional experiences that they are likely to encounter following graduation from the program. The ACS strongly encourages Work Integrated Learning (WIL) conducted in conjunction with an industry partner or client, for example:
- Internships and Industry Placements (Industry-Based Learning, IBL).
- On-campus WIL, including real case studies, engagement with industry professionals and so on, are important preparations for professional practice, especially so where they are designed as integrated components of the program.
- A final-year, team-based project conducted in conjunction with a real industry client, is a very effective structured learning experience to prepare graduates for professional practice.

A well-rounded ICT graduate will additionally have a range of less specific professional attributes including:
- being adaptable through a capacity for life-long learning
- using and designing modern ICT tools effectively
- being both innovative and entrepreneurial
- appreciating ICT professional activity in a global economy
- staying in touch with the professional and research literature in their areas of expertise and being able to apply it.

The program will provide graduates with the relevant knowledge and skills that will assist them to acquire these attributes.

3.2.2 ICT Program Implementation Pathways

A program must meet the accreditation criteria in every possible program pathway and mode in which the program is offered and at all locations. Accreditation is granted for the programs identified in the testamur or academic transcript for each program. If one pathway is not accreditable, then the program as a whole cannot be accredited.

Double Degree Programs

To be accredited, a double degree program will fully satisfy the ICT program criteria specified in this document.

Honours Programs

Where an honours program is a separate award extending an accredited bachelor's degree it is not separately accredited.

Where an honours program is integrated with a bachelor's program and has a separate title on the testamur or transcript it will be evaluated for accreditation as a program separate from the bachelor's program.

Postgraduate Diploma Programs

It is possible that a post-graduate diploma program may meet accreditation criteria.

Master's Programs

To be accredited, a non-cognate master's program will fully satisfy the ICT program criteria specified in this document.

A Cognate Master's program, where the entry requirement is a degree in ICT, may not in itself satisfy accreditation criteria but may be considered for accreditation where:

a. the program is identical with an accreditable non-cognate masters but gives advanced standing for the early part of the non-cognate program; or

b. entry to the program can be achieved by the satisfactory completion of a nested award (e.g. completion of a specific graduate certificate that provides ICT foundation skills and knowledge), such that the complete pathway meets the professional level accreditation criteria.

Articulation Arrangements, Credit / Recognition of Prior Learning

Various program implementation pathways may involve mandatory subjects being sourced from outside the institution. Where credit is given the institution must demonstrate how it ensures comparable assessment of ICT subject outcomes.

Credit may not be relied on for any subject that addresses *Criteria D, E or F* or subjects that address the key aspects of *Criterion B* or the essential aspects of *Criterion C.*

Internships and Industry Placements

The ACS strongly encourages internship and industry placements involving cooperation between the education provider, the student, and one or more ICT employers.

Internships and industry placements would normally include the following features:

   a. an ICT-practice experience of sufficient duration for substantial work to be undertaken, and completed prior to the final academic semester

   b. an administrative role focussed on helping students to find suitable practice experience placements and institutional processes for student support, insurance, contractual matters, early problem detection and resolution, etc.

   c. pre-internship preparation for students

   d. clearly articulated and assessable ICT subject learning outcomes with comprehensive documentation of these criteria and how they are met

   e. careful selection of the internship site considering:
        - scale of ICT enterprise
        - qualification of the workplace supervisors (who should be at SFIA
              level 5+ and preferably members of the ACS)
        - educationally supportive approach of the workplace supervisors

   f. careful selection of the internship work considering:
        - sufficient duration for substantial work to be undertaken and completed
        - scope for student to take some responsibility and experience authentic learning

   g. regular monitoring and formative assessment of the internship with student and supervisors

   h. summative assessment with input from all stakeholders.

Regardless of the length of a WIL or IBL program, it may count at most 2 subjects towards the ICT *Volume of Learning* (*Criterion A*) or *Advanced ICT Knowledge Addressing Complex Computing* (*Criterion D*).

On-Line Education

For the purposes of accreditation only, the ACS sees "Online Education", as including those subjects where there is little or no physical face-to-face learning (see HESF Guidance Notes - Technology-Enhanced learning). A program comprising only online subjects is considered to be a separate 'campus' for the purpose of accreditation.

To be accredited, a program involving mandatory subjects in the Online Education mode will include the following features:

a. The educational design, content, learning activities and assessment measures will be purpose-built to support the on-line student in a comprehensive and independent manner.

b. The academic staff will be committed, equipped and adequately trained to support online education mode.

c. The facilities will support
   - equitable access (equivalent in quality, if not in kind) to student services, academic and administrative support for online education students
   - virtual group and team-based learning experiences
   - communications at a quality approaching that of face-to-face.

d. There will be mechanisms to address identity management in a virtual environment.

e. The Institution will ensure that professional and personal skills outcomes are assessed and attained.

Educational Locations and Partnerships

HESF Section 5.4 applies (see also HESF Guidance Notes - Third Party Arrangements and Transnational Higher Education), ICT accreditation has the following specific criteria:

The institution will have means to ensure that all accreditation criteria specified in sections 3.1 and 3.2 of this manual are met at each location where the program is offered. Managing a multi-location program can present significant issues for management and academics in ensuring comparable outcomes, balancing local and central contexts, communications and so on.

Managing programs that are presented by partner organisations presents issues. Clear leadership, policies and practices need to be in place which are closely monitored to ensure accreditation criteria are met and are seen to be met.

Where a program is taught at multiple campuses and graduates hold identical testamurs or transcripts, the Accreditation Committee will evaluate and accredit the program as a single entity. The accreditation criteria will be met at all locations or combinations of locations through which the program can be completed. That is, every student who graduates with an accredited award will have completed all assessments against mandatory criteria and will have been appropriately supported throughout their education.

Where the location of a program is identified on the graduate's testamur or transcript, it will be evaluated for accreditation in its own right.

3.3 ADVANCED PROFESSIONAL LEVEL ACCREDITATION

ACS Advanced Professional level accreditation recognises master's level programs (AQF level 9) that are designed to enhance the skills of ICT professionals. A graduate from an accredited ICT program at Advanced Professional level is expected to have the attributes identified in CBoK Section 6.3, but at a higher level of attainment:

> a. Specialised knowledge and skills for ICT professional practice and/or research

> b. An advanced and integrated understanding of a complex body of knowledge in one or more disciplines or areas of practice in ICT

> c. Expert skills to independently research, critically analyse synthesise and reflect on information, concepts and theories in ICT and apply these effectively to complex problems

> d. Expert, independent judgement, adaptability and responsibility as a senior practitioner.

3.3.1 Entry Criteria

Entry to the program requires:
- professional qualification accredited by a Seoul Accord signatory, or equivalent

and
- A minimum of 2 years professional ICT experience at SFIA level 4.

3.3.2 Advanced ICT Program Design and Content Criteria

Programs designed for Advanced Professional accreditation will satisfy all the criteria specified in Section 3.2 of this manual at a higher level of expertise to ensure that Graduate Attributes are achieved:

Criterion B: Professional ICT Roles and Skills
> The program will nominate at least one professional role that requires an advanced qualification. The program will address at least one ICT skill at SFIA level 5 or above in the specific area related to the intended ICT professional role.

Criterion C: Coverage of ICT Knowledge
> Essential CBoK areas will be developed to an advanced level.

Criterion D: Advanced Knowledge to address Complex Computing
> At least two thirds of the program will be at an advanced level addressing complex computing.

Criterion E: Integrated and Applied ICT Knowledge
> The program will include a significant research or industry project demonstrating the attainment of advanced knowledge and skills.

3.4 SPECIALIST ACCREDITATION

Some areas of the profession are recognised by specialist certification at the Certified Professional (CP) and Certified Technologist (CT) levels. While every program accredited by the ACS addresses a specific part of the profession, Specialist Accreditation recognises those programs which prepare graduates for the part of the profession serviced by Specialist Certification. A specialist program is one aimed only at the specialist part of the profession; it is not just a major in another program.

A program accredited as specialist is expected to have:
- a title that identifies it as addressing a part of the profession serviced by professional certification
- as an objective to produce graduates prepared for a professional role in that part of the profession
- develop the skills required to fulfil that professional role
- cover the appropriate disciplinary body of knowledge.

Programs accredited at the *Professional Specialist* level meet all the criteria for accreditation and in doing so accommodate the specialist criteria specified below. A graduate of an accredited Professional Specialist program will have the knowledge criteria for specialist certification at Certified Technologist (CT) level.

Programs designed for *Advanced Professional Specialist* level accreditation meet all the criteria for advanced accreditation and in doing so accommodate the specialist criteria specified below. A graduate of an accredited Advanced Professional Specialist program will have met the knowledge criteria for specialist certification at the Certified Professional (CP) level.

3.4.1 Cyber Security

All programs designed for Cyber Security Specialist accreditation will:
- have a title identifying it as being in only the Cyber Security domain
- have an objective to produce graduates prepared for a professional role in Cyber Security
- identify a specific Cyber Security professional role from SFIA or the European ICT Framework.

A program designed for ***Professional Specialist level accreditation*** in Cyber Security will:
- address professional skills at SFIA level 3 specifically required to fulfil a Cyber Security professional role.
- contain at least 1 EFTSL (8 subjects) of content drawn from an appropriate Cyber Security body of knowledge (eg. CyBok) compatible with CBoK. This content may include one Cyber Security related subject, see comparable definition for 'ICT-related subject' in 1.1 Terminology above.

A program designed for ***Advanced Professional Specialist level accreditation*** in Cyber Security will:
- address at least one professional skill at SFIA level 5 specifically required to fulfil a Cyber Security professional role.
- contain at least 1 EFTSL (8 subjects) of content drawn from an appropriate Cyber Security body of knowledge (eg. CyBok) compatible with CBoK. This content may include one Cyber Security related subject, see comparable definition for 'ICT-related subject' in 1.1 Terminology above.

3.4.2 Data Science

Data Science, for the purpose of ACS accreditation, covers a cluster of academic and occupational streams including Data Science, Data Analytics, Data Architecture, Data Engineering and Data Wrangling often in tandem with Business Analysis, Database Management, Business Intelligence, Visualisation, Statistics, and other related areas.

A program designed for Data Science Specialist accreditation will:
- have a title identifying it as being in the Data Science domain
- have an objective to produce graduates prepared for a professional role in Data Science
- identify a specific Data Science professional role from SFIA or the European ICT Framework.

A program designed for *Professional Specialist level accreditation* in Data Science will:
- address professional skills at SFIA level 3 specifically required to fulfil a Data Science professional role.
- contain at least 1 EFTSL (8 subjects) of content drawn from an appropriate Data Science body of knowledge (eg. Edison or ACM) compatible with CBoK. This content may include one Data Science related subject, see comparable definition for 'ICT-related subject' in 1.1 Terminology above.

A program designed for *Advanced Professional Specialist level accreditation* in Data Science will:
- address at least one professional skill at SFIA level 5 specifically required to fulfil a Data Science professional role.
- contain at least 1 EFTSL (8 subjects) of content drawn from an appropriate Data Science body of knowledge (eg. Edison or ACM) compatible with CBoK. This content may include one Data Science related subject, see comparable definition for 'ICT-related subject' in 1.1 Terminology above.

VERSION HISTORY

Date	Document Version	Revision History (reason for change)	Author /Reviser
28 Oct 2013	1.0	Creation of original document	
27 Oct 2014	1.1	Minor updates	Graham Low
15 Dec 2015	1.2	Changes to section 3.2.3 and Appendix 7. Insertion of Appendix 8.	Graham Low
19 Feb 2016	2.0	Version update in alignment with CBoK release	Berny Martinez
13 July 2017	2.1	Minor edits on distance/off-shore study	Ernie Jauwan
31 Jan 2019	4.0 Pilot	Complete revision: clarified criteria, aligned with TEQSA, simplified application	Craig McDonald
15 Dec 2019	5.0	Incorporate feedback from pilot – minor edits	Craig McDonald
15 Sep 2020	5.1	Cybersecurity specialisation – minor edits	Craig McDonald
30 Aug 2021	5.2	Data Science specialisation – minor edits	Craig McDonald
22 Nov 2022	5.3	Minor edits to accommodate revised CBoK	Craig McDonald

APPROVALS

Date approved	Version:	Approved By	Date in force	Next Review Date
15 Dec 2015	1.2	Professional Standards Board	15 Dec 2015	n/a
19 Feb 2016	2.0	Professional Standards Board	19 Feb 2016	n/a
1 Feb 2019	4.0 Pilot	Management Committee	22 Feb 2019	n/a
29 Jan 2020	5.0	Rupert Grayston, Director PSAS	1 Feb 2020	n/a
15 Sep 2020	5.1	Rupert Grayston, Director PSAS	15 Sep 2020	n/a
30 Aug 2021	5.2	Siobhan Casey, A.Director PSAS	30 Aug 2021	n/a
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