ACS Accreditation Committee
Document 2: Application Guidelines – Professional Level and Advance Professional Level Programs
ACCREDITATION MANAGEMENT MANUAL

Australian Computer Society
Professional Standards Board

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1. INTRODUCTION

The Australian Computer Society (ACS) is the authority responsible for the accreditation of professional ICT education programs in Australia. The ACS is also a signatory to the Seoul Accord (http://www.seoulaccord.com/). The Accord signatories accord mutual recognition to their respective accreditation schemes for undergraduate degree programs. Membership of the Accord requires accreditation schemes to consider a set of standard graduate attributes by demonstrating a mapping of scheme requirements to those attributes. The Seoul Accord Graduate Attributes[1] are mapped to the ACS Accreditation Requirements for Professional level accreditation in ACS Accreditation Document 4: Seoul Accord Graduate Attributes. This mapping ascertains that a program satisfying the ACS accreditation criteria will satisfy the Seoul Accord requirements, and forms the substance of the ACS adherence to the Accord.

This guidelines document has been prepared to guide institutions seeking accreditation. The accreditation criteria provide the basis for evaluation of ICT education programs and 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.

In this guidelines document each criterion is developed more fully to clearly establish the key requirements for compliance and performance expectations.

The accreditation criteria are catalogued under the following section headings and the subsequent discussion is in accordance with this structure:

- Organisation and Resources (Section 3.1)
- Program Design and Content (Section 3.2)
- Quality Assurance (Section 3.3)

2. INTERPRETATION OF REQUIREMENTS

In this development of the criteria an attempt has been made to distinguish absolute requirements for accreditation from expected characteristics and performance levels and advice. Again, the emphasis is on encouraging excellence, innovation and diversity in the educational design, delivery and quality processes. Statements often employ the words must

[1] The graduate attributes for a Seoul Accord computing professional graduate are:

- Academic Education: Completion of an accredited program of study designed to prepare graduates as computing professionals
- Knowledge for Solving Computing Problems: Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
- Problem Analysis: Identify and solve *complex* computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines
- Design/ Development of Solutions: Design and evaluate solutions for *complex* computing problems, and design and evaluate systems, components, or processes that meet specified needs
- Modern Tool Usage: Create, select, or adapt and then apply appropriate techniques, resources, and modern computing tools to *complex* computing activities, with an understanding of the limitations
- Individual and Team Work: Function effectively as an individual and as a member or leader of a team in multi-disciplinary settings
- Communication: Communicate effectively with the computing community about *complex* computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions
- Computing Professionalism and Society: Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice
- Ethics: Understand and commit to professional ethics, responsibilities, and norms of professional computing practice
- Life-long Learning: Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional

and should. Statements containing must denote absolute requirements for the program to be accredited. Statements containing should are not individually binding but for accreditation to be granted, it is expected that the program will meet a high proportion of them, and accreditation panels will question seriously any failure to meet these requirements.

3. GUIDELINES TO THE CRITERIA

3.1. Organisation and Resources

3.1.1. Identifiable Organisational Structure and Demonstrated Commitment to ICT Education

There must 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. In documents comprising the Accreditation Management Process, the organisational entity responsible for ICT education is referred to as the "ICT School", or simply "School". 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.

It would normally be expected that the School would have leadership responsibility – subject to the approval processes of the host educational institution – for the educational design, delivery, support and management of the ICT programs, for the management of associated resources, and for the appointment and professional activity of staff. If this is not the case, the Institution will need to demonstrate how sufficient ICT expertise is brought to bear on decisions in these areas.

The delegated accountability within the ICT School for the management and delivery of each ICT education program should be clearly specified.

There must be evidence that the host Institution regards ICT education as a significant and long-term component of its activity, and has adequate arrangements for planning, development, delivery, and continuous quality improvement of ICT programs, and for supporting the associated professional activities of staff. This would most commonly be evident from an institution's mission statement and strategic plans, from the approved mission statement and strategic plans of the ICT School, perhaps from corporate responses to ICT School planning submissions or initiatives, and from the outcomes of formal reviews and performance evaluations.

The host Institution must have in place adequate policies and mechanisms for funding its ICT School and facilitating the generation of funds from external sources. Similarly there must be established policy and appropriate practices for attracting, appointing, retaining and rewarding well-qualified staff and providing for their ongoing professional development, and for providing and updating infrastructure and support services. The Institution must ensure that effective leadership is available to the ICT School through the appointment of highly-qualified and experienced senior staff in sufficient numbers.

There must be in place formal structures for the ongoing review and improvement of programs and for formal approval of new program proposals and program amendments.

3.1.2. Academic and Support Staff Profile

The teaching staff must be sufficient in number and capability to assure the quality of the ICT programs and the attainment of their stated outcomes. The ACS believes that a significant

complement of staff appointed on a continuing basis, as opposed to a sessional basis, is necessary to provide the strong, cohesive 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 support bachelor degree level student learning.

As a guide, a viable ICT School would be expected to have a minimum of six full-time-equivalent ICT academic staff employed on a continuing basis.

The School would be expected to have not less than three full-time-equivalent staff with specialist ICT knowledge and experience in any field in which a designated degree or major is offered. In no case must a major program be dependent on a single individual continuing staff member.

Only in very exceptional circumstances is it likely that the ACS will judge an institution without such a staffing profile as meeting accreditation requirements.

There should be an acceptable balance of staff appointments across the A (tutor) - E (professor) academic levels in order to provide appropriate academic leadership and at the same time providing the experience profile, the teaching expertise and student support appropriate to the program. It would be expected that at least one staff member with significant involvement in ICT education provision is employed at least at associate professor level (level D). (It is recognised that in some multi-disciplinary schools, the senior staff at levels D and E who provide executive leadership of the School may not be ICT academics. In such cases, it must be demonstrated that there is adequate program leadership at senior lecturer level (level C), and that the School executive staff demonstrate thorough understanding of the requirements of ICT education to provide a suitable foundation for offering programs dedicated to the education of future professionals.)

It is considered important that the staff should come from a diverse range of backgrounds, embodying a mix of academic experience and ICT-practice experience in non-academic environments, both internationally and nationally. The School's research and/or professional activities should include vigorous interaction with industry and the professional community.

In gauging the capabilities of staff, the Panel will look at qualifications (both in ICT and education), research and practical ICT activities, teaching experience, and contributions to the advancement of ICT knowledge, practice and education. Involvement in professional societies and effective participation in ongoing professional development are also relevant indicators of suitable capability.

Staff development programs should aim at developing capabilities in educational design, the use of new delivery and assessment methodologies and in the development of learning quality management systems as well as at enhancing professional standing within a specific ICT discipline. Academics should be aware of the need to address gender, cross-cultural, inclu-siveness and equity issues. Staff development programs should reflect this need.

In addition to the full-time academic staff team, ICT schools are strongly encouraged to make use of the expertise of practising professionals in ICT and related fields for guest lecturing and other sessional teaching.

There must be adequate arrangements for the supervision and guidance of both regular and sessional staff.

The Panel will look for evidence that academic staff numbers and teaching loads are such as to permit adequate interaction with students and support for the range of learning experiences offered, with adequate opportunity available to staff for professional engagement outside of teaching. Arrangements for workload management, capacity planning and succession planning should be evident in support of these objectives.

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

The ICT School and/or the Institution must have sufficient staff and facilities to provide adequate levels of student counselling, support services, and interaction with relevant constituencies such as employers and graduates.

It is recognised that programs will increasingly be staffed and delivered in a variety of modes, where students will be supported to undertake learning activities at locations other than the 'host' campus through workplace and cooperative learning programs, distance delivery and offshore arrangements. Educational institutions will form partnerships with both traditional and non-traditional providers to facilitate the delivery of ICT education. The Institution/s awarding the degree will be considered responsible for assuring the capabilities of all staff involved, and the Panel will require evidence of how this is achieved.

3.1.3. Academic Leadership and Educational Culture

The Panel will look for 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 practices recognised in industry as being good.

There should be significant, ongoing involvement of all teaching staff in the processes of setting educational outcome targets, detailed educational design, review and continuous quality improvement. A strategic approach for the design, implementation and maintenance of a particular program requires the full involvement of all teaching staff as a team and this should be evident to students.

For each program there should be a clearly identified leader of the teaching team. Terms of reference, accountabilities and reporting obligations for the teaching team and program leader should be clearly defined and understood by all stakeholders.

The teaching team is expected to meet regularly to consider input and feedback from the full range of constituencies, and use this in the ongoing improvement of detailed learning strategies, structure, curriculum content and delivery. The teaching team should monitor, using clearly stated criteria, the attainment of outcomes for the program as a whole as well as the delivery of learning outcomes within individual units of study.

Staff should model the attitudes evident in the Institution's graduate attributes, the program outcomes and the ethos of the ICT profession and should be continually aware of their responsibility to do so.

There should be clear acknowledgment of the need to link research, industry and community interaction with teaching to enrich the experiences of students and facilitate the ongoing professional development of staff.

Teaching staff at off-shore and partner institutions should be fully consistent with the above requirements of staff.

3.1.4. Facilities and Physical Resources

For all students, whether on-campus, at partner campuses or undertaking external studies, there must be, as appropriate, adequate classrooms, learning-support facilities, study areas, library and information resources, computing and information technology systems, and general infrastructure to fully support the achievement of the targeted learning outcomes for each specific program.

For all programs and associated implementation pathways, there must be adequate facilities for student-staff interaction. For distance education with remote campus or offshore implementations there must be sufficient facilities to provide students with learning experiences and support judged to be equivalent (in quality, if not in kind) to that available through on-campus attendance.

Appropriate experimental facilities must be available for students to gain substantial experience in understanding and operating ICT equipment, and of designing and undertaking ICT project work. The equipment must be reasonably representative of contemporary ICT practice and facilitate sound learning design. Facilities need to support structured laboratory activities as appropriate to the flavour of the program, and also offer support for more open-ended project based learning.

Where practical work is undertaken remotely from the host campus, such as at another educational institution or in an industry environment, the arrangements must be such as to provide appropriate facilities, supervision and equipment access and an assured equivalence of learning outcomes.

3.1.5. Funding

The funds provided through the host organisation, from all sources including government grant funds, fee income, and direct income earned through research and entrepreneurial activity, must be sufficient to support the current ICT education programs and satisfy the resource aspects of the accreditation criteria. The strategic planning cycle and funding distribution models must ensure predictable levels of support and the ongoing viability of the ICT program/s.

3.1.6. Strategic Management of Student Profile

Resources provided to the ICT School are frequently dependent on student numbers. A criterion for viability is therefore a continuing level of demand for admission from adequately-qualified candidates in sufficient numbers to maintain the program.

The admission system must adequately publicise the qualifications required for entry and ensure that only qualified candidates are admitted. Where credit or advanced standing is offered (especially through articulation programs), there must be demonstrable quality-assured processes for the analysis, assessment and verification of prior learning against program outcomes. Generally, credit-transfer recognition for prior learning must be on the basis of study at a similar level in an institution of appropriate standing. (For example, in Australia credit transfer in respect of first or early second year units might be granted for work completed in a program assessed at AQF Level 5 or 6, such as a TAFE Diploma or Advanced Diploma.)

The ICT School should be able to demonstrate a reasonable relationship between admission standards and student retention and graduation rates.

3.2. Program Design and Content

3.2.1. Specification of Educational Outcomes

To ensure that a systematic approach is taken for the balanced development of graduates, each program submitted for accreditation must be supported by a published specification of educational outcomes tailored to the particular field(s) of practice and associated area(s) of specialisation targeted by the program. The educational outcomes specification should justify the inclusion or omission of any specialist title. External stakeholder input is critical to the development, review and auditing of attainment of these outcomes.

The educational outcomes specification should include a statement of broad objectives as well as targeted graduate capabilities for the program in the specified field of the program. The rationale for the specification of outcomes should be founded on the needs of industry and the community[2], trends in professional practice and comparisons with programs of a similar nature available nationally or internationally. Providers are expected to make use of the categories and skills in the SFIA[3] framework in identifying particular vocational outcomes targeted by the program.

The statement of educational outcomes should relate to the mission of the host Institution and reflect the specialist ICT focus of the program, the anticipated career destinations of graduates, and the needs of appropriate external constituencies.

The educational outcomes specification is also expected to reflect the desired characteristics and/or capabilities and/or achievements of mature graduates within the first few years of their career following graduation. It also needs to be appropriate within a broad definition of ICT - a profession trusted by society for conceiving, designing, implementing, maintaining, managing and ultimately disposing of infrastructure, products, processes and services within broad contextual criteria.

Each graduate attribute must include measurable performance indicators to provide a basis for monitoring the level of attainment. The multidimensional performance metric in each case is likely to involve both quantitative and qualitative measures with inputs from a range of sources. Such measures would draw considerably on formal assessment processes from within academic units as well as from the feedback and direct input of various constituencies.

The specification of educational outcomes should provide a platform for subsequent educational design and review tasks and provide a key reference for mapping the aggregation of learning outcomes and assessment measures from individual academic units comprising the program.

It is acknowledged that many institutions have their own internal policies and procedures relating to graduate attributes, and mechanisms for quality assurance of the educational processes that deliver these outcomes. The ACS does not wish to override these, nor to place onerous additional responsibilities on ICT schools. Accordingly, in most cases reproduction of

[2] It is acknowledged that some programs may have specific graduate attributes and outcomes attuned to preparing students for postgraduate research study, and where this is the case, it should be identified and explained.

[3] Skills Framework for the Information Age (www.sfia.org.uk)

documents prepared for internal quality assurance purposes will be acceptable evidence for the ACS, perhaps augmented to address specific ACS requirements.

3.2.2. Titles of Program and Award

ACS recognises that diversity among courses is not only inevitable but desirable. ICT schools traditionally differentiate the requirements of courses variously referred to as 'Computer Science', 'Information Systems', 'Computer Systems Engineering' and 'Software Engineering'. ACS acknowledges that there are many acceptable variations of these programs. Further, there are new emerging program areas such as ‘Health Informatics’, and more multi-disciplinary programs are expected to emerge over the coming years.

A professional ICT program must aim to deliver graduates with capabilities appropriate to a designated field of the ICT profession. This will most commonly be reflected in the title of the program and/or degree, or cited as a major field of study in the academic transcript. It is not essential, however, for any nominated specialisation to appear in the degree title. The key requirement is that the program engages students with a coherent area of ICT, providing an appreciation of current issues and developing competence in handling advanced problems in the area.

Where a title does denote a specialisation in a particular field of practice, the program should impart high-level ICT (and in some cases domain or application) skills and knowledge in that specialisation.

New program titles may be expected to arise in response to evolving industry and professional practice. Programs may draw on several existing fields of specialisation, and may incorporate new knowledge or the application of knowledge in new practice environments.

ACS does not wish to be prescriptive about titles, nor does it wish to encourage a proliferation of specialist titles that may have transitory lifetimes and confuse stakeholders, especially school leavers. It reserves the right to query a title or field of practice which it regards as possibly inappropriate and to make recommendations about the appropriateness of any title.

3.2.3. Professional level accreditation

ACS Professional level accreditation is designed to assist educational institutions to provide appropriate preparation for initial professional practice in ICT. Accreditation is normally considered at the level of a School within Universities and is primarily intended for Bachelor degree programs. Postgraduate programs that properly prepare students for initial professional practice in ICT are also eligible to be accredited at the Professional level.

A qualification at AQF level 7 (or above) is a basic requirement for an ACS accredited program for initial professional practice. Hence the AQF level 7 graduate attributes are adopted as the starting point. They are refined with knowledge specific requirements for the ICT industry.

An ICT graduate from a Professional level accredited degree should have the following attributes.

1. A broad and coherent knowledge and skills for ICT professional work and further learning in a global economy[4]. This knowledge should extend to being innovative and entrepreneurial as appropriate to the ICT occupation they are pursuing.

2. A broad and coherent theoretical and technical knowledge with depth in one or more disciplines or areas of practice in ICT.

3. A well-developed cognitive, technical and communication skills to select and apply methods and technologies to:
    a. analyse and evaluate information to complete a range of activities in their ICT area of expertise;
    b. analyse, generate and transmit solutions to unpredictable and sometimes complex ICT problems; and
    c. transmit knowledge, skills and ideas to others.

4. An ability to apply knowledge and skills to demonstrate autonomy, well-developed judgement and responsibility:
    a. in contexts that require self-directed work and learning; and
    b. within broad parameters to provide specialist advice and functions.

3.2.3.1 Program Structure and Implementation Framework

The normal requirement of an accredited professional ICT program in Australia is three (3) years of full-time-equivalent study, based on entry from a satisfactory level of achievement at Higher School Certificate level (12 years of primary and secondary schooling) or equivalent. Programs offered via alternative implementation pathways (elective units and study sequences, workplace learning options, defined articulation routes, part-time attendance, distance mode, offshore and remote campus) must be demonstrably equivalent in terms of content, in the delivery of graduate outcomes as well as in the learning expectations of students.

The conventional academic year involves two semesters of formal study and examination, offering apparent scope for accelerated progression utilising the remainder of the calendar year. In considering any program that offers completion in significantly less than three calendar years, the Panel must be assured that it provides adequate opportunity for personal and professional skills development and delivers the full equivalence of defined outcomes. It is anticipated that there will be a growth in the number of programs with the equivalent of three

[4] Graduates should have an understanding of working in a global ICT industry. This would include understanding issues such as cultural differences, legal/regulatory differences, etc.

academic years of study that can be completed within two calendar years by utilising a trimester model, and generally such programs will be acceptable.

The curriculum must comprise an integrated set of tasks and structured learning experiences that lead to the delivery of the specified educational outcomes, and by implication, satisfactory attainment of the graduate attributes. The necessary opportunities and support mechanisms must be provided.

The program structure and curriculum must be appropriate to the development of in-depth ICT competence in the designated field of practice and in nominated specialist areas. The following criteria are aimed at ensuring that the ACS ICT Graduate Attributes for a Professional level accredited program are achieved (see also Appendix 8).

Programs designed for Professional level accreditation must satisfy the following specific requirements:

a. There must be a minimum of one and a half equivalent full time years of material in the program (i.e. 50 per cent of the content of a typical three-year degree program) that is focused on the development of the ICT outcomes and the body of knowledge required and defined for the program.[5]

b. The program must provide appropriate coverage of the ACS Core Body of Knowledge for ICT Professionals (CBOK), and further explained in Section 3.2.5 *(see also Appendix 7: Extract from ICT Profession Core Body of Knowledge)*. For those aspects which are covered only briefly, a clear rationale must be given as to why this is so.

c. The program must contain a unit (hereafter called a "capstone unit") in the final year that integrates the material of the program that is focused on the principal role outcomes, and which allows the student to demonstrate that he/she has mastered the program objectives. *(See Appendix 3: Capstone Unit)*

d. The program must contain material that provides a structured learning experience to facilitate a smooth transition to professional practice or, in the case of programs targeting a research role, further study in the discipline. (See Appendix 4: Professional Practice). This would include graduates being able to apply their knowledge to complex computing problems as defined by the Seoul Accord. (See Appendix 6: Complex Computing).

e. It is common, and to be recommended, that programs include a final-year team-based project for a real client, that fulfils both of the preceding requirements. However, it is acceptable that these requirements be satisfied separately in other ways, as long as a rigorous argument is given for their fulfilment of the requirements. Accreditation panels will be particularly vigilant to assess points c. and d. above in such a case.

f. The required ICT material must progress through all years of the program with at least one half of a full-time year of the ICT material at genuinely advanced level (generally final year) – topics which clearly provide extra depth in ICT. (A detailed definition of "advanced level", which will be used by accreditation panels, is provided in *Appendix 5: Advanced Level Study.)* The submission must show how these advanced units add depth to knowledge gained in earlier units, including identifying pre-requisite knowledge for the units. Depth can be developed through both process (as in a project) or through in-depth study in a particular area, but not through process alone. At least one quarter of a full-time year of the advanced material should consist of in-depth study as opposed to purely project work.

g. The structure of a program should clearly promote a graded transition of learning experiences from a more directed beginning to a more independent learning approach

[5] In situations where there is less than 1.5 years' of specific ICT study, it must be clearly demonstrated that the appropriate number of other units directly relate to the specified vocational outcomes in a way that goes beyond merely providing a context for ICT to be applied. For instance a core subject without specific ICT content may be considered to "focus on the development of ICT outcomes and the body of knowledge required and defined for a program" if it is a demonstrable prerequisite for a later core subject with direct ICT content, or can be linked to the intended ICT program objectives, graduate attributes, or vocational outcomes. Counting a core subject without specific ICT content, as focusing "on the development of ICT outcomes and the body of knowledge required and defined for a program" will be based on the professional judgment of the accreditation Panel. Institutions should take care to explicitly demonstrate links between core subjects without direct ICT content to the skills required to achieve the ICT roles intended in their written accreditation submissions.

in the final year.

h. The program must address at least one ICT skill at SFIA level 3 or above in a specific area related to the intended career role.

i. The program should provide graduates with the relevant knowledge which will assist them in being both innovative and entrepreneurial in a global economy.

3.2.3.2. Graduate Programs for Initial Professional Practice

Professional level accreditation is awarded to academic programs that prepare graduates for initial professional practice in ICT and address accreditation guidelines articulated in this document.

Professional level accreditation guidelines were generally written for the accreditation of undergraduate programs. Masters (and postgraduate diploma) programs may also be accredited at the professional level, provided that they meet all of the criteria specified in the professional level accreditation guidelines. Specifically Master's (or Graduate Diploma) degree programs would need to have a minimum duration of three semesters equivalent full-time study in order to meet the requirements for advanced level study in ICT, and if only the equivalent of three semesters in duration, would need to have all units directed towards development of the graduate outcomes and body of knowledge required and defined for the program.

Masters programs that address a narrow ICT specialisation will generally not qualify for professional level accreditation due to their focus on limited topics from the ACS ICT Profession Core Body of Knowledge.

The granting/consideration of Professional Level accreditation of non-cognate masters programs will generally be identical to that of undergraduate programs, except that students will have a prior tertiary background in a non-ICT discipline.

Cognate masters programs may be shown to meet the criteria for initial professional practice in ICT and address the guidelines for professional level accreditation if one of the following criteria is satisfied:

- A non-cognate masters and a cognate masters with different award names are offered and are identical with the exception that the cognate masters omits four ICT foundation units in the non-cognate version, and the non-cognate version meets the professional level accreditation guidelines.
- Non-cognate entry to the cognate masters 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 guidelines.
- A program takes both non-cognate and cognate entry students, but cognate-entry students are given advanced standing for up to four foundation subjects on specified CBOK topics and there is a rigorous process to manage this.

In all cases, accredited masters programs must meet all of the criteria detailed in the professional level accreditation guidelines. This includes section 3.2.4 (Curriculum and Body of Knowledge) and Appendix 3 (Capstone Unit).

When the Capstone Unit is an individual research project, CBOK topics not utilised in the project (e.g. professional skills like teamwork) must explicitly be taught and assessed elsewhere in the course. It is incumbent upon the institution to demonstrate CBOK coverage to a depth appropriate for the intended career roles, and that there is/are a unifying capstone experience(s) that integrate learning from across the program.

Although not required, it is recommended that masters programs with a cognate component be designed to produce graduates at who demonstrate levels of autonomy and responsibility at SFIA level 5 or greater.

3.2.3.3. Dual Majors

Some programs take the form of a dual major. ACS requires the present policy and criteria for single degrees to be met and demonstrated in full for both the single and dual major configurations. Any differences in the requirements between the single major and a dual major configuration of the degree should be documented.

3.2.3.4. Combined / Dual / Double Degrees

Some programs take the form of combined or double degrees, combining an ICT outcome within a nominated specialist field with a second outcome in either another discipline altogether or in a second specialist field of ICT, deemed equivalent to completing two bachelor degrees. (This does not include single bachelor degrees with dual majors, which are handled under Section 3.2.3.2.) In most instances, two individual degree testamurs are awarded, but sometimes a combined outcome is specified on a single testamur. Typically, the combined program occupies substantially less time than would the case if the two degree programs were taken separately. The award of the combined / double degree is achieved by identifying content and learning experiences which may validly be counted towards both qualifications.

In all cases, for the accreditation of each professional ICT program, ACS requires the present policy and criteria for single degrees to be met and demonstrated in full.

3.2.3.5. Honours degrees

Honours degrees may be awarded as an extension of a bachelor's degree. In this case the honours extension is not separately accredited since students already have accreditation from the basic bachelor's degree.

Honours degrees may also be awarded as an integral part of a bachelor's program (e.g. programs for which honours may be awarded). In this situation the program is accredited as a whole since the honours component is an integral part of the basic bachelor's degree.

The honours year may count towards the experience requirements for ACS professional certification provided it is in an area relevant to the SFIA specialism(s) of the applicant when applying for Certified Technologist (CT) or Certified Professional (CP) [6].

3.2.3.6. Work-Integrated Learning (WIL)

Some educational institutions offer programs in which students are required to gain substantial practical experience in industry, or other ICT-practice settings interspersed with the academic program. These are generically known as Work-Integrated Learning (WIL) or in some

[6] http://www.acs.org.au/sfia-certification/acs-certification/pathways-to-certification

cases Industry-based Learning (IBL) programs, involving cooperation between the education provider, the student, and one or more ICT employers.

WIL programs would normally include the following features:

- an ICT-practice experience requirement taken in periods of sufficient duration for substantial work to be undertaken, and completed prior to the final academic semester;
- stated and assessed learning outcomes from this element of ICT practice experience;
- comprehensive documentation of these requirements and how they are met; and,
- an office providing assistance to students in finding suitable practice experience placements.

ACS strongly encourages such programs, and accredits them in the same way as any other professional ICT program.

Where the work-based learning extends the study period beyond the normal three year program, the WIL component may be counted towards the experience requirements for ACS professional certification at Certified Technologist (CT) or Certified Professional (CP) levels.

Regardless of the length of a WIL or IBL program, it may count at most one quarter of an academic year towards the requirements of points a. and f. (Section 3.2.3).

3.2.4. Advanced Professional level accreditation

ACS Advanced Professional level accreditation recognises Masters level programs (AQF level 9) programs that are designed to enhance the ICT skills of professionals already holding an ACS level accredited degree (or Seoul Accord accredited degree) or equivalent and a minimum of 2 years SFIA generic level 4 experience. The program should be designed to address at least one ICT skill at SFIA level 5 or above in a specific area related to the intended job role.
Completion of an Advanced Professional level program may reduce the experience requirement for Certified Professional (CP) by the length of the program (up to a maximum of 2 years).

An ICT graduate from an Advanced Professional level accredited degree should have the following attributes[7].

- Specialised knowledge and skills for ICT research, and/or professional practice and/or further learning.
- An advanced and integrated understanding of a complex body of knowledge in one or more disciplines or areas of practice in ICT.
- Expert, specialised cognitive and technical skills in an body of knowledge or practice to independently:
    - analyse critically, reflect on and synthesise complex information, problems, concepts and theories in ICT;
    - research and apply established theories to a body of knowledge or practice in ICT;
    - interpret and transmit ICT knowledge, skills and ideas to specialist and non-specialist audiences.
- Ability to apply ICT knowledge and skills to demonstrate autonomy, expert judgement, adaptability and responsibility as a practitioner or learner.

3.2.4.1 Program Structure and Implementation Framework

[7] Based on the AQF level 9 graduate attributes

The following criteria are aimed at ensuring that the ACS ICT Graduate Attributes for an Advanced Professional level accredited program are achieved.

Programs designed for Advanced Professional accreditation must satisfy the following specific requirements:
a. Entry to the program requires: o An undergraduate ACS accredited degree or a course accredited by a Seoul Accord signatory, or equivalent. and o Ideally a minimum of 2-3 years ICT experience with a minimum of 2 years as SFIA generic level 4. Where this is not the case institutions should justify how the program can still achieve the desired SFIA level 5 skill. b. Program duration equivalent to at least 18 months full time study. All units should contribute to the achievement of the designated ICT job role. c. The program should address at least one ICT skill at SFIA level 5 or above in a specific area related to the intended career role. d. The program should be structured so that students have a clear progression through the program to achieve the designated SFIA job role(s). e. All units should be at an advanced level with all subjects using assessments that require elements of analysis, evaluation and synthesis (Levels 4, 5 and 6) of Bloom's taxonomy. f. The program should include a capstone unit in the final semester, ideally for an industry-based client, to enable the student to demonstrate application of at least one SFIA level 5 skill. g. The program should provide appropriate coverage of the Professional Knowledge area of the ACS ICT Profession Core Body of Knowledge (Section 3.2.5 *(see also Appendix 7: Extract from ICT Profession Core Body of Knowledge)*.

3.2.5. ICT Profession Core Body of Knowledge

The ACS Core Body of Knowledge for ICT Professionals (CBOK)ensures all graduates from a Professional level accredited program have an in-depth understanding of the skills and knowledge areas common to all ICT professional occupations. These Essential ICT Knowledge areas are:

- ICT Problem Solving;
- ICT Professional Knowledge;
  - ethics;
  - professional expectations;
  - teamwork concepts and issues;
  - interpersonal communication;
  - societal issues/legal issues/privacy; and
  - understanding of the ICT profession

Independent of any specific ICT occupation, an ICT professional is expected to hold an in-depth understanding in each of these two areas (ICT Problem Solving and ICT Professional Knowledge. The accreditation process also expects an in-depth understanding of the "ICT Management" area of Project Management.

Graduates are also expected to have at least a conceptual understanding of the General ICT Knowledge areas (Technical Resources, Technology Building, and ICT Management).

The application for accreditation must address the ICT Profession Core Body of Knowledge for all programs for which accreditation is sought. A pro-forma, requiring the mapping of all units of study against the CBOK with associated Bloom's levels is provided as Form 4 in Document 3 (Guidelines for Submission). It is suggested that this form be completed once for all undergraduate units of study and again for postgraduate units of study regardless of the number of programs included in the accreditation application. Form 5 is then used to map the units of study (included in Form 4) to specific programs.

Please see Appendix 7 for more details on the ACS Core Body of Knowledge for ICT Professionals(CBOK).

3.3. Quality Assurance

Appropriate policies, processes and practices must be in place at all levels within the Institution to assure the quality of ICT education. The dimensions of the educational quality system must embrace the following components.

3.3.1. Engagement with external stakeholders

A specific requirement of the Accreditation Policy is a formally-constituted advisory mechanism or mechanisms, involving program constituencies generally, and industry in particular. The ICT School must secure the active participation of ICT professionals, graduates, professional bodies and leading employers of ICT graduates in defining, updating and evaluating specified outcomes for each program.

An advisory body is expected to operate at the strategic level in monitoring and analysing industry needs and trends, as well as in the review and performance monitoring of the program objectives and graduate capability targets. In addition, it should ideally have significant input to establishing performance standards and strategies for monitoring the development of technical competence, ICT application skills and personal and professional skills for each particular program.

Depending upon organisation structures, there may be a case for a two-tiered approach, to provide strategic direction and advice on the one hand, and then specific input to the educational design, review and performance monitoring at the individual program level on the other. In some instances this may be achieved by a single advisory body, with individual members or sub-groups accepting engagement to provide advice and assistance in learning design at a more detailed, operational level, and in others by quite separate strategically and operationally oriented bodies. Members of such bodies may well also serve as adjunct staff or assessors of student performance.

An effective and productive industry engagement is also crucial for providing students with the necessary range of exposure to professional ICT experience as well as providing opportunity for collaborative project work and the professional development of staff.

3.3.2. Feedback and stakeholder input to continuous improvement processes

There must be formal processes for securing specific and systematic feedback from constituencies such as students, graduates, employers and representatives of the wider community. There should be evidence of the systematic application of feedback in conjunction

with other quantitative measures to setting, monitoring and reviewing outcomes at program and academic unit level.

Direct involvement of the student body as partners in the processes of continuous quality improvement is strongly encouraged. Staff-student consultation forums, focus groups and commissioned submissions can facilitate productive involvement as well as providing direct educational experiences for the student in the processes of quality assurance.

External stakeholder feedback and input should provide an important dimension in monitoring the delivery and attainment of program objectives and graduate capability targets.

3.3.3. Processes for establishing and reviewing educational outcomes

There must be formal, documented processes for setting and reviewing the detailed educational objectives and graduate capability targets for each program as a whole. Reviews should be regular and ongoing. These processes should ensure that the outcomes specification remains aligned with accreditation requirements as well as external practices and specific industry needs. The specification of targeted graduate capabilities should cover enabling skills and knowledge, depth and breadth of technical competence, ICT application skills, as well as personal and professional capabilities.

Systematic review processes should be inclusive of all staff engaged in the delivery of the program (including those engaged in the delivery of programs at regional and offshore campuses and by partners), and involve the ongoing input of external constituencies as well as feedback and input from the student body.

3.3.4. Strategic approach to educational design and review

A systematic and strategic approach to educational design, review and continuous quality improvement must be evident. This may be similar to the process outlined in Section 3.2.3 above, but need not agree in all aspects. What is essential is a conscious, defined process designed to achieve specified outcomes.

Beginning with the specification of educational objectives and targeted graduate capabilities, a strategic approach to learning design should next determine the specific and measurable learning outcomes for each unit of study (subject) within the program.

At the unit level, the learning design process should continue by developing the appropriate learning activities and the formative and summative assessment approaches which monitor and measure the delivery of the learning outcomes. Closing the loop on learning outcomes, learning activities and assessment measures at the academic unit level should be a prime objective.

A mapping of the learning outcomes from individual units of study to the targeted graduate capabilities for the program as a whole should be a prime reference tool emerging from this process and underpin the outcomes based educational design. Subsequently, tracking this aggregation of learning outcomes and assessment measures from individual units to close the loop on the delivery of graduate capabilities at the program level is a key component of the ongoing review and improvement process.

Again, the educational design, review and continuous quality process should be inclusive of all program teaching staff through regular interactions, and involve the ongoing input and feedback of the student body. Performance assessment at every level should involve a variety

of measures, as well as input from an appropriate range of stakeholders, and drive the improvement cycle.

The overall goal of the learning design process is to ensure that the curriculum as a whole addresses the educational outcomes set for the program in a substantial, coherent and explicit way.

ACS expects that all staff at all locations delivering a program are well informed on program objectives and have input to the design process.

3.3.5. Approach to assessment and performance evaluation

The development of assessment and performance monitoring systems must be an integral part of the overall educational design process for any particular program.

There should be evidence that the assessment tools and evaluation processes within each unit are rigorously aligned with the designated learning outcomes for the program.

At the program level, assessment measures from within individual academic units, along with a range of inputs, feedback and performance measures gleaned from the full range of constituencies, will come together to provide multi-dimensional data appropriate for evaluating performance against the standards set for each of the targeted educational outcomes. Substantiating delivery of the prescribed outcomes in this way will validate satisfactory attainment of the capabilities and thus ensure that the generic attributes specified in the Accreditation Policy are developed to a sufficient degree in all graduates.

Summative and formative assessment tools may include examinations, tests, quizzes and project reports; self, peer, and mentor appraisals; portfolios and journals; oral examinations and interviews; and behavioural observations. It is expected that almost all units would not rely solely on multiple choice questions but on assessment demonstrating application, analysis and synthesis.

It is important that students on a program be required to perform in at least one assessable situation involving a significant open-ended and wide-ranging challenge, drawing on knowledge and capability from different subject areas. The capstone unit(s) and/or other advanced units should address this requirement.

There should be a documented system for setting, reviewing and monitoring the delivery of learning outcomes associated with professional experience.

The assessment regime should address the full range of graduate capabilities, including personal and professional skills development.

A rigorous moderation process should be in place to monitor and manage the assessment processes within units of study.

3.3.6. Management of alternative implementation pathways and delivery modes

There must be rigorous processes for monitoring and managing alternative implementation pathways within a particular program definition, and for assuring the equivalence of educational outcomes for the program as a whole. Such alternative implementation pathways will range from specialised entry routes and elective academic units within an established home campus program, right through to an offshore or remote campus offering of such a program. (See Appendix 2: Twinning and Alternate Campuses)

This includes online delivery (see Appendix 1: Distance Education), external (off-campus) teaching and programs delivered by partner organisations both within Australia/New Zealand and overseas.

Accreditation of the program requires that the program be accredited at all locations and in every form of delivery. Where such alternative pathways are available the application must address these requirements for each alternative pathway.

3.3.7. Benchmarking

ICT schools should engage in some form of comparative analysis to ensure that exit-level performance standards are comparable with national practice, and preferably international practice for the full range of graduate capabilities. Comparative analysis could include exchanges of teaching and assessment materials, discussion forums, visitation teams and/or the use of external examiners, if so desired. Beyond this, more systematic benchmarking could help in identifying best practices and specific directions for improvement.

The accreditation process will evaluate program standards, but education providers should do so as part of the process of setting the performance criteria and monitoring targeted graduate outcomes, and not rely on the accreditation system for this.

3.3.8. Approval processes for program management

There must be formal approval processes associated with program and curriculum planning and review, with due reference to demand analysis, the input of external constituents, and quality management processes.

4. INTRODUCING NEW PROGRAMS

4.1. New Program Implementation on the Home Campus

An ICT School with accredited programs may choose to introduce a new program within the context of an existing operating framework and established quality system already considered by the Accreditation Committee as part of the most recent general review[8] of programs.

Where the new program is in a pioneering field of ICT, or where an educational institution is contemplating the establishment of a new school of ICT, advice might be sought from the Accreditation Committee. In such cases, the Committee may appoint an experienced person to respond to questions, or may suggest persons who may be consulted directly.

Provision of such advice expressly does not constitute any guarantee of ultimate accreditation. Further, the Accreditation Committee or any of its members will not involve themselves in any way in the engagement as consultants, or actively contribute to program design.

Where the intention is to seek accreditation for a new program then the Society should be notified in writing of the proposal prior to commencement of the first student cohort. It is suggested that this notification be instigated at the time the proposal is submitted for approval though the internal institutional processes.

Application for provisional accreditation of the new program should be made in the first year of operation. Where this falls within the normal five-year general review cycle, the written submission should be prepared as a supplement to the most recent written submission for general review.

The submission for provisional accreditation should be developed against the accreditation criteria outlined in Section 3.2.3. It should not, however, duplicate material already submitted for the most recent general review.

In most instances the criteria dealing with the organisation and resources and the quality system will have been substantially addressed in the most recent general review submission. It is only necessary to respond to an individual criterion where circumstances or issues are differentiated for the new program or where changes in the environment have occurred since the most recent general review.

With regard to the academic program criteria, it will be necessary to develop an appropriate response addressing the specific objectives, educational outcomes, title, structure, content, implementation details and professional practice exposure issues unique to the new program.

It is particularly critical that a clear rationale is presented for the new program. This should demonstrate appropriate consultation with industry and other research that has established projected demand for graduates, led to the choice of title and underpinned the development of the graduate outcomes specification, program structure and content.

The new program cannot be considered for full accreditation until the first sizeable, regular cohort of students enters the final stages of the program close to the point of graduation. Again, ACS should be advised in writing once this cohort enters its final year of study. An update on the submission for provisional accreditation should be prepared, again responding to the accreditation criteria by addressing any changes in circumstances and the experiences and outcomes arising from implementation of the program. It is particularly important that the

[8] i.e. the normal 5-yearly accreditation visit.

submission for full accreditation reports in detail actions and progress made on the recommendations in the report of the provisional accreditation evaluation Panel.

4.1.1. Consideration of Provisional Accreditation

For a new program in a well-established school in good standing, provisional accreditation of a new program can occasionally be given on the basis of a desk-top assessment of the submitted documentation. “Good standing” means that all programs offered by the school that were aimed at preparing graduates for initial profession practice were accredited at the last general review without significant difficulty.

In the majority of circumstances the Accreditation Committee will require a Panel visit to consider a new program for provisional accreditation. This would normally occur in the first year of operation, where a sizeable cohort of students has been enrolled.

The Accreditation Committee has the discretion to determine whether a visit is required and when provisional accreditation is appropriate.

4.1.2. Transition to Full Accreditation

Key considerations for the transition to full accreditation will be the School’s documented response to recommendations made in the report of the provisional accreditation evaluation Panel and the quality of assessed student work in the latter study years of the program.

A visit will normally be necessary to assess transition to full accreditation. This assessment will follow a formally documented submission from the School. Assessment could be undertaken as early as during the final semester of study of the first graduating cohort, provided sufficient access can be provided to representative examples of assessed final year student work, and also to a representative group of graduating student.

At the very latest, full accreditation should be sought at the next scheduled general review following the emergence of the first graduates.

Where full accreditation is considered in between general review visits and the School is in good standing, a visit by one senior Panel member (or the relevant Visit Manager acting on behalf of the Panel) may be sufficient to recommend full accreditation. In other cases a full visit may be necessary.

4.2. New Program Implementation for a Regional or Offshore Campus

For an established regional or offshore campus with accredited professional ICT programs already in place, the accreditation of a new program offering should follow the guidelines detailed in 4.1.1 above.

Where the new offering is a fresh implementation of a program already established and accredited at the home campus or on other campuses, then the documentation for both provisional and subsequently full accreditation may well build on documentation already submitted previously for implementations of the program elsewhere.

Where an established program on the home campus is to be newly implemented at a regional or offshore campus or where a new program is to be introduced for the first time at a regional or offshore campus, the Accreditation Committee will normally require a visit to occur for consideration of provisional accreditation.

Where a new regional campus or offshore operation is first being established and provisional accreditation is to be considered for the first program offerings then the submitted documentation will need to be more comprehensive than that expected for just a new program offering within an established operating environment. The submitted documentation in this case will need to respond to all aspects of the accreditation criteria, with particular attention to the sections dealing with the quality systems and the operating environment. It is critical that the submission analyses all aspects of the development, delivery and management of the program and in particular the differentiating features associated with the new operating environment.

5. PROGRAM AMENDMENT

The Accreditation Committee must be informed in writing, via the Society, of significant changes to established, accredited programs and to the operating environment within a school. The terms of accreditation will normally provide for the ongoing development of program structures and content and in fact encourage enhancement and innovation within the defined quality management framework.

Changes to program structure and content within the existing specification of educational objectives and targeted graduate outcomes are welcomed and expected within the accreditation cycle as part of the process of continuing quality improvement.

The Accreditation Committee will monitor program amendments through written advice received from the Institution. The provider should ensure that all changes are within the accreditation guidelines, such that program and the school as a whole continue to comply with the accreditation criteria.

Formal review of changes will normally occur at the next scheduled general review of programs by the ACS.

Where a proposed program amendment involves a change to the program title or to the overall specification of educational objectives or targeted graduate outcomes then the Accreditation Committee, via the Society, should be notified in writing prior to the implementation of the change. Under such major changes the Accreditation Committee, once satisfied that the accreditation criteria continue to be met, will make a decision on whether to continue the current accreditation status or to accord provisional accreditation to an essentially new program definition.

APPENDIX 1: POLICY ON DISTANCE EDUCATION

1. INTRODUCTION

It is recognised that new approaches to teaching and learning, including for delivery in distance education mode, are constantly being developed, and are to be encouraged.

Without being unduly prescriptive about criteria that might apply to distance education, it is incumbent upon an accreditation Panel to ensure that the knowledge and attributes appropriate for entry to the profession are attained by all graduates of the program through whatever delivery mechanism.

2. POLICY STATEMENT

Programs will be evaluated for accreditation which are delivered fully or partly in distance mode.

"Distance education", according to this Policy Statement only, includes those programs where there is no third party involvement in the delivery of the program. Where a third party is involved, the program will be considered under the policy on partner campuses (see Appendix 2 – Policy on programs delivered at alternative campuses and twinning).

The accreditation criteria and processes are set out in the ACS Accreditation Manual to which this is an appendix.

The ACS may modify these guidelines from time to time, and input is invited from education providers.

3. GUIDELINES

These guidelines as the basis for the evaluation of programs delivered in the distance education mode. The guidelines are not prescriptive but where the Institution does not follow them the Panel will wish to be convinced that any alternate approach has the same outcomes.

1. A distance education program should generally be built on an existing program that is delivered concurrently to on-campus cohorts; however programs offered in purely distance mode can also be considered.

2. Electronic and/or face-to-face opportunities must be provided to allow distance education students to interact with staff and in particular to ensure that group and team based learning experiences are included in the program.

3. The educational design, learning activities and assessment measures must be purpose-built to support the student in a comprehensive and independent manner.

4. There must be equitable access (equivalent in quality, if not in kind) to student services, academic and administrative support for distance education students.

5. There must be specific and adequate mechanisms for the tracking of professional and personal skills in the distance education mode to ensure the satisfactory delivery and assessment of the required outcomes.

6. It is encouraged that distance education students be required to participate in residential on-campus learning activities to allow the Institution to ensure that

professional and personal skills outcomes are attained. Although most practical experience may be gained off-campus it is important that staff be convinced of a student's practical capabilities first hand. If there is no residential component, the Institution must demonstrate convincingly how these capabilities will be assessed.

7. The bandwidth, performance and accessibility of electronic communication systems must be adequate to ensure the quality and effectiveness of learning support.

8. The academic staff must be committed, equipped and adequately trained to support distance education mode.

There must be an overarching quality system that includes the distance education mode and engages the students as a key stakeholder in the process.

APPENDIX 2: POLICY ON TWINNING AND OFFSHORE CAMPUSES

1. INTRODUCTION

ACS recognises that Australian universities offer programs in partnership with other organisations, at alternate Australian campuses and offshore. The accreditation process requires accreditation of such programs to ensure compatibility of outcomes with the program offered on the home campus.

Twinning refers to formal arrangements with other providers - generally, but not always, overseas institutions - whereby students undertake the initial stage/s of a program at the other institution and then transfer to an Australian institution, with predetermined credit, to complete the program and qualify for the award.

Twinning refers to a formally-agreed arrangement with another provider which envisages significant cohorts of students and specifies credit, usually for an integral number of years of a program.

A twinning arrangement may involve recognition by the Australian institution that the first two years say of an overseas institution's curriculum is equivalent to its own, or that a sub-degree qualification completed elsewhere will attract a defined level of credit and recognised entry point to the Australian program.

Alternatively, it may involve the overseas institution specifically teaching the first two years say of the Australian institution's curriculum, with or without some assistance from the Australian institution's staff.

The first twinning programs introduced in Australia commonly involve a first year of study overseas, giving entry to a degree program in Australia at second-year level (known as a 1+2 program). Building on market experience, 1+2 programs have been progressively introduced.

2. POLICY STATEMENT – ALTERNATE AND OFF-SHORE CAMPUSES

It is a requirement that documentation submitted for accreditation of a program should include information about all major locations at which the program is offered, to the same depth and level of detail. Similarly, it is expected that the accreditation Panel will visit all such locations and will interview staff and students at each.

Where the offshore program is separately identified from the home program, it will normally be treated as a separate accreditation exercise and each program will be evaluated for accreditation in its own right. In such a case, the offshore program must be identified in some way that is evident from the graduate's testamur; for example the award title may be different, or the delivery location must be shown.

Where graduates of the offshore and the home programs hold identical testamurs, and the two are represented by the Institution as one program offered in multiple locations, then the Accreditation Committee will evaluate and accredit the program as a single entity. The accreditation criteria must be met at all locations or combinations of locations through which the program can be completed.

The program cannot be accredited at any one location (including the "home" campus) unless it is accredited at all locations, since by the Institution's own statement, there is no distinction.

The accreditation criteria and processes are set out in the ACS Accreditation Manual, of which this is an appendix.

ACS will modify these guidelines from time to time and input is invited from education providers.

3. POLICY STATEMENT - TWINNING PROGRAMS

Where no more than one year of the program is completed overseas (or in another Australian institution), substantial reliance is placed on the institution's second and third years as sufficient tests of the quality of the initial part of the program. Accreditation policy should still require the institution to explain what mechanisms it uses to assure quality in the overseas component (and/or other Australian-based institution) and that the ACS required outcomes are attained.

Where the first two years are completed overseas and only the final year is taken in Australia, the approach to accreditation will depend on whether the overseas program follows identically the Australian curriculum, or whether it is an overseas-owned curriculum recognised as equivalent.

If the Australian institution can certify that the first two years of the overseas program follows essentially the Australian curriculum, if there are substantial formal examinations which are set and marked in common between the Australian and overseas programs, if other forms of assessment can be shown to be essentially identical, and if all these aspects are part of the formal twinning agreement, then it will normally not be necessary to visit the overseas establishment.

In all other cases, ACS will require documentation through the Australian institution and will conduct a visit to the overseas establishment, on a full-cost-recovery basis. As in the case of wholly-offshore programs, the ACS will liaise with the local professional associations.

4. GUIDELINES – CAMPUS VISITS

1. In all cases the Society will receive documentation from the Institution and will arrange an accreditation visit to the offshore location under the normal procedures. It is particularly important that the documentation be received well ahead of the proposed visit, so that any apparent difficulties can be identified in advance and the visit rescheduled if necessary.

2. The Institution concerned will be expected to reimburse the Society for all costs associated with an offshore accreditation visit. This will also include an additional administrative fee which at present is not normally charged within Australia.

3. ACS wishes to undertake offshore accreditation activities only where these are acceptable to relevant authorities in the host country. On receipt of a request from an Australian institution for offshore accreditation, The Society will wish to negotiate with the host-country professional association and will not wish to undertake a visit until that association has expressed its concurrence with the arrangements. ACS preference is to conduct visits jointly with the host-country association. The Institution will be kept fully informed of such negotiations and involved to the maximum extent appropriate.

4. A check list of the information required is included in Section 6

5. OVERALL PRINCIPLES

In all instances, the onus is on the Institution awarding the degree to demonstrate that the accreditation criteria are met.

As with evaluations conducted within Australia, ACS reserves the right to investigate in depth how stated outcomes are actually achieved in practice.

In arranging any visit to an offshore campus or institution, the Society will consult with the accreditation authorities in the country concerned and will endeavour to secure their agreement and/or participation in the process

6. INFORMATION REQUIREMENTS FOR THE ACCREDITATION OF PARTNERSHIP/EXTERNAL AND OVERSEAS CAMPUSES OF AUSTRALIAN UNIVERSITIES

The Committee is interested to learn about the structure and operation of the partnership campuses of the Institution.

In general, the Panel will wish to be assured that the campus offers educational experiences, facilities and standards comparable to those on the home campus of the Institution and that quality assurance mechanisms are in place to ensure the Institution maintains control of the educational program.

The overriding criterion is that students have the same opportunities to achieve the program outcomes.

- *Structure*
    - Arrangements with commercial partners
    - Review processes of the arrangement
    - Host Institution educational vision

- *The Campus*
    - Physical facilities
    - Library
    - Computing facilities
    - Recreation and cultural development
    - Other student support services

- *Academic staff*
    - Profile and qualifications
    - Selection procedures
    - Contracts of employment
    - Research activities
    - Student/staff ratios
    - Knowledge of program outcomes and design principles

- *Support staff*
    - Profile
    - Selection procedures

- *Selection of students*
    - Criteria
    - Procedures
    - Control of Institution admission criteria

    - Who decides credit/advanced standing?
    - Where are the final decisions made?

- *Curriculum*
    - Equivalence to main campus offerings
    - Variety of choice
    - Inculcation of professional and personal skills
    - Access to industry and the profession
    - Access to real life projects and IBL (if present on home campus)

- *Teaching arrangements*
    - Class sizes, locations

- *Quality assurance processes, including, for example*
    - Oversight by senior faculty of home campus
    - Assessment of student's work
    - Moderation processes
    - Management of student progression
    - Feedback on teaching
    - Feedback on student support services
    - Graduate outcomes
    - Graduate satisfaction
    - Progression rates

APPENDIX 3: POLICY ON CAPSTONE UNITS

1. INTRODUCTION

Accredited degree programs should be holistic in design, leading to comprehensive skills and knowledge required for professional practice in a given ICT discipline or focus area. A Capstone Unit (often, and ideally, implemented as a final year team project) is one way that students can demonstrate comprehensively a coherent attainment of the intended skills and knowledge set as objectives of the program, and also model professional practice in the discipline.

2. POLICY STATEMENT – CAPSTONE UNIT

Accredited degree programs must contain a unit (called a "Capstone Unit"), or collection of units, that integrates the skills and knowledge developed throughout the program.

3. GUIDELINES – CAPSTONE UNIT

These guidelines should be used in designing and implementing a Capstone Unit. These guidelines are not prescriptive. Where the Institution does not follow them, the Panel will wish to be convinced that their alternative approach addresses the objectives outlined in the Policy Statement.

The Capstone Unit should be designed, implemented, and assessed according to the following guidelines:

- The Capstone Unit should require the integration of skills and knowledge acquired throughout the course.

- Ideally, the Capstone Unit should provide a learning experience that is based on the type of professional experiences that a graduate is likely to encounter following graduation from the program, allowing students to apply the whole range of knowledge and skills learned on their program to a challenging real problem related to the specified program outcomes.

- ACS strongly recommends that the Capstone Unit should involve a team project conducted in conjunction with a real industry client, as it believes that this is the optimal structured learning experience to facilitate a smooth transition to professional practice or further study in the discipline (see Appendix 4). Artefacts generated during such a project should require a student to analyse information such as project requirements, evaluate and justify design decisions, and create new products, positions, or points of view. Assessment rubrics should measure achievement of both technical outcomes and of professional skills such as project management, leadership and teamwork. Marks should be based on authentic project artefacts developed by students over a period of time, and generally not be based on tests and exams. Additional consideration should be given to critical reflections on learning submitted by relevant stakeholders. Stakeholders may include students, academic supervisors, and industry partners.

- The Capstone Unit should be of significant scope, requiring student effort at least equivalent to that associated with 25% of a full-time semester load.

- Projects in Capstone Units requiring additional effort or spanning multiple semesters are strongly encouraged, but not required. The Capstone Unit will normally occur during the final year of study. Exceptions must be strongly argued, and generally will not be accepted.

APPENDIX 4: POLICY ON AN INTRODUCTION TO PROFESSIONAL PRACTICE

1. INTRODUCTION

Accredited degree programs should enable students to demonstrate comprehensively the attainment of the intended skills and knowledge set as objectives of the program, and also model professional practice in the discipline. Often this will be achieved through projects which implement the requirements for Capstone Units (see Appendix 3).

2. POLICY STATEMENT – PROFESSIONAL PRACTICE

Accredited degree programs must facilitate for graduates a smooth transition to professional practice or further study in the discipline.

In the case that the Capstone Unit (see Appendix 3) is not oriented towards a transition to professional practice, the program must include other experiences which do facilitate such a transition.

3. GUIDELINES – PROFESSIONAL PRACTICE

The program should provide students with an authentic learning experience in relation to its intended professional outcomes. 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. This would include the application of their knowledge to complex computing problems.

In many cases, this will be achieved through Work-Integrated Learning (WIL), which is very strongly encouraged, and / or an industry project conducted in conjunction with an industry partner or client.

On-campus learning experiences involving engagement with industry professionals, of significant scope and integrated across the extent of the program, are also acceptable, provided the learning experiences strongly capture significant aspects of professional practice for a graduate in the discipline.

Often the Capstone Unit (see Appendix 3), implemented as a team project for an external client, will address this requirement.

APPENDIX 5: POLICY ON ADVANCED STUDY UNITS

1. INTRODUCTION

Accredited degree programs must contain the equivalent of one semester of advanced study directly related to the specified outcomes of the program. This policy provides guidance to educational organisations and accreditation Panel members in determining what is advanced study.

2. POLICY STATEMENT – ADVANCED LEVEL STUDY

At least half the units in an accredited program contribute directly to the development of an ICT professional. One third of the ICT units must be advanced level, equivalent to one semester of full-time study.

3. GUIDELINES – ADVANCED LEVEL STUDY

- These guidelines should be used in designing and implementing advanced study units. These guidelines are not prescriptive. Where the Institution does not follow them, the Panel will wish to be convinced than any alternate approach addresses the objectives outlined in the Policy Statement.

- Advanced units would normally add to knowledge and skills attained in earlier units of study. The submission must show how these units add depth to knowledge gained in earlier units, including specifying the pre-requisite knowledge for the units. Depth can be developed through both process (as in a project) or through in-depth study in a particular area, but not through process alone.

- A Capstone Unit or Project is one way that students can undertake advanced study; however, it is expected that at least half of the advanced units will contribute towards the development of specialist knowledge rather than just requiring the application of such knowledge acquired in earlier units. *(See Appendix 3 : Capstone Units)*

- To demonstrate that a unit is advanced, the subject must:
    - require pre-requisite knowledge from at least one other unit for one of the three main SFIA skills required for the ICT job role of the graduates;
    - use assessments that demonstrate cognition at the Application Level (Level 3) or higher in Bloom's Taxonomy (see below); however, they should also require elements of analysis, evaluation and synthesis (Levels 4, 5 and 6) of the taxonomy[9].

[9] It has been argued that the hierarchy of Bloom's taxonomy does not ideally recognise the prevalent requirement to engage in analysis, evaluation and synthesis in order to apply ICT knowledge and skills to solving real problems.

Bloom's Taxonomy provides a means of categorising the cognitive level to which knowledge is used. It consists of six levels. These are: (1) Knowledge; (2) Comprehension; (3) Application; (4) Analysis; (5) Evaluation; and (6) Synthesis. These are further described in the table below

Bloom's Taxonomy

Bloom's Level	Bloom's Category	Description
1	Knowledge	Facts and figures can be recalled.
2	Comprehension	Information is understood well enough to explain it to others.
3	Application	Knowledge can be applied to new problems.
4	Analysis	Compare and contrast alternatives by decomposing a problem and understanding relationships.
5	Synthesis	Devise new approaches or understanding by reassembling and reconstructing existing knowledge and information.
6	Evaluation	Make judgements and recommendations based on an evaluation of available data and information.

- Note that the a unit being offered in the third year of a program is not sufficient to identify it as being advanced; in contrast, some units taught in the second half of second year might, in exceptional circumstances, qualify as advanced.

APPENDIX 6: POLICY ON COMPLEX COMPUTING

1. INTRODUCTION

Graduates from accredited degree programs should be able to apply their knowledge to complex computing problems as defined by the Seoul Accord.

The Seoul Accord defines a complex computing problem for a Computing Professional graduate as **c**omputing problem having some or all of the following characteristics:

- 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; and
- Identification of a requirement or the cause of a problem is ill defined or unknown.

2. POLICY STATEMENT – PROFESSIONAL PRACTICE

There is an expectation that students will be progressively be exposed to more complex computing problems as they progress through their program.

3. GUIDELINES – PROFESSIONAL PRACTICE

Institutions should identify which complex computing attributes are addressed by individual units to show where students are required to apply their knowledge to complex computing problems and that this exposure is progressively acquired throughout their program.

It is expected that all advanced units (including the capstone unit) should provide an opportunity for students to apply their knowledge to a complex computing problem.

APPENDIX 7: EXTRACT FROM THE ACS CORE BODY OF KNOWLEDGE FOR ICT PROFESSIONALS (CBOK)

The CBOK is used both to support the accreditation and certification processes. It provides:

- Essential ICT Knowledge required for any ICT professional. This includes ICT Professional Knowledge and ICT Problem Solving; and
- General ICT Knowledge which provides graduates with a breadth of understanding of the ICT industry regardless of his/her ICT job role. This includes Technical Resources, Technology Building, and ICT Management.

APPENDIX 7.1: ESSENTIAL ICT KNOWLEDGE

All graduates are expected to have an in-depth understanding of two knowledge areas: ICT Professional Knowledge and ICT Problem Solving.

KNOWLEDGE AREA: ICT PROFESSIONAL KNOWLEDGE

This area includes:

- ethics;
- professional expectations;
- teamwork concepts and issues;
- interpersonal communication;
- societal issues/legal issues/privacy; and
- understanding of the ICT profession..

It is expected that Professional Knowledge topics will need to be addressed at multiple levels in different stages of professional development. The very nature of professional work means that some knowledge and skills are best developed through experience and that understanding of complex issues such as ethics grows with maturity. Thus, the goals for developing professional knowledge/skills will be different at entry-level (graduate) than at full professional level (a certification program).

Ethics

Topics covered should include:

- fundamental ethical notions (virtues, duty, responsibility, harm, benefit, rights, respect and consequences);
- basic ethics theories;
- integrity systems including the ACS Code of Professional Conduct, ethics committees and whistle blowing;
- methods of ethical analysis including methods of ethical reflection, and methods and procedures of ethical repair and recovery; and
- ICT specific ethical issues (professional – e.g. compromising quality and conflict of interest, and societal – e.g. phishing and privacy).

Professional expectations

Topics covered should include: expertise, certification, competence, autonomy, excellence, reflection, responsibility and accountability.

Teamwork concepts and issues

Topics covered should include collaboration, group dynamics, leadership styles, conflict resolution, team development and groupware.

Communication

Topics covered should include oral and written presentations, technical report writing, writing user documentation and the development of effective interpersonal skills.

Societal issues
Topics covered should include history of computing and the ICT discipline, privacy and civil liberties, cybercrime, intellectual property and legal issues .

Understanding of the ICT profession
Professionals should have some knowledge of where and when their discipline began and how it has evolved, in addition to understanding of ongoing issues in the discipline.

KNOWLEDGE AREA: ICT PROBLEM SOLVING
This requires knowledge of how to use modelling methods and processes to understand problems, handle abstraction and design solutions.

The methods and tools that are used for handling abstraction could vary a great deal with the branch of ICT, from circuit diagrams to data modelling tools to business process modelling.

It is important to recognise this area because it captures some of the creativity and innovation that is required of ICT professionals, and the excitement that is present in their jobs. Recognising this component also assists in identifying what is unique about ICT and what differentiates it from other disciplines. In no other discipline is there such an emphasis on developing artefacts (e.g., computer and information systems) which are so abstract and complex and where modelling tools and methods are essential. The systems that ICT professionals deal with cannot be seen or handled in the same simple and direct manner as products of other applied disciplines (e.g., buildings, bridges, chairs, drugs). Consequently, highly developed problem solving skills and the need for methods to handle abstraction and modelling are absolutely vital.

APPENDIX 7.2: GENERAL ICT KNOWLEDGE
As well as have essential core ICT knowledge (ICT Problem Solving and ICT Professional Knowledge), it is important that all graduates have a conceptual understanding of ICT as a broad discipline.

KNOWLEDGE AREA: TECHNOLOGY RESOURCES
This area includes:

- hardware and software fundamentals;
- data and information management; and
- networking.

Hardware and software fundamentals
An understanding of the basic components of computer systems is required, including:

- computer architecture and organisation - including processors, memory, storage systems and input/output devices; and
- systems software – operating systems and application system software.

Data and information management
An understanding is required of how data is captured, represented, organised and retrieved from files and databases. Topics include:

- data modelling and abstraction;
- database Management Systems (DBMS);

- information assurance and security in a shared environment;
- acquisition, custodianship and eventual disposition of information; and
- nature of data, information and knowledge transformation through technologies.

Networking

This area requires an understanding of data communications and networking fundamentals. Topics include:

- network concepts, protocols and standards;
- network security;
- wireless and mobile computing; and
- distributed systems.

KNOWLEDGE AREA: TECHNOLOGY BUILDING

This area includes:

- human factors;
- programming;
- systems development; and
- systems acquisition.

Human factors

This area requires an understanding of the importance of the user in developing ICT applications and systems, and involves developing a mindset that recognises the importance of users, their work practices and organisational contexts.

Programming

This involves an understanding of the fundamental concepts of a programming language. It is expected that the requisite knowledge of programming fundamentals would be best developed by engaging students in software developments tasks (programming). However, the range of programming languages and tools that could be used to develop this knowledge is wide and will vary with the expected ICT job role of the graduate.

Systems development and systems acquisition

An understanding is required of how to develop or acquire software (information) systems that satisfy the requirements of users and customers. All phases of the lifecycle of an information system should be understood including requirement analysis (systems analysis) and specification, design, construction, testing, and operation and maintenance. There should also be knowledge of methodologies and processes for developing systems.

KNOWLEDGE AREA: ICT MANAGEMENT

This area includes:

- IT governance and organisational issues;
- IT project management;
- service management; and
- security management.

IT governance and organisational issues

Topics covered should include:

- fundamental governance principles (e.g. structures to encourage moral behaviour within organisations and corporations, and moral behaviour by organisations and corporations); and

- organisational context, including business processes, organisational culture, change and risk management.

IT project management

This area involves an understanding of the factors required to successfully manage systems development projects. Topics include: team management, estimation techniques, cost/benefit analysis, risk analysis, risk management, project scheduling, quality assurance, software configuration management, project management tools, reporting and presentation techniques.

Service management

Service management deals with the ongoing operation of ICT in an organisational context and includes frameworks for structuring the interactions of ICT technical personnel with business customers and users. Many frameworks exist to guide ICT service management, for example, the Information Technology Infrastructure Library (ITIL) and Control Objectives for Information and Related Technology (COBIT).

Security management

Topics covered should include:

- computer system security: CPU, Peripherals, OS. This includes data security;
- physical security: the premises occupied by the ICT personnel and equipment;
- operational security: environment control, power equipment, operation activities;
- procedural security: by IT, vendor, management personnel, as well as ordinary users; and
- communications security: communications equipment, personnel, transmission paths, and adjacent areas.

APPENDIX 8: ASSESSMENT OF ICT GRADUATE ATTRIBUTES FOR PROFESSIONAL LEVEL ACCREDITATION

The ACS ICT graduate attributes for Professional level accredited programs are assessed during an accreditation visit as follows:

1.) Depth of knowledge

a. Each program is required to specify the ICT job role for its graduates and the mapping of required SFIA skills to fulfil that ICT job role at SFIA level 3 or above. The program must provide the underlying discipline knowledge and skills to support graduates achieving the required SFIA skills at level 3 (or above). (Section 3.2.3.1 (h)).
b. The required ICT material must progress through all years of the program with at least one half of a full-time year of the ICT material at genuinely advanced level (generally final year) – topics which clearly provide extra depth in ICT (normally supporting the identified SFIA skills).). (Section 3.2.3.1 (f))
c. The program must also contain a unit (hereafter called a "capstone unit") in the final year that integrates the material of the program, is focused on the principal role outcomes, and which allows the student to demonstrate that they have mastered the program objectives.). (Section 3.2.3.1 (c))

2.) Breadth of ICT knowledge

d. Graduates must have a broad understanding across the different areas of ICT by ensuring they have a conceptual understanding of all General ICT Knowledge areas of the CBOK.). (Section 3.2.3.1 (b))

3.) Professionalism

e. All graduates must have in-depth knowledge of the ICT Essential Knowledge areas: ICT Professional Knowledge & ICT Problem Solving in a global economy.). (Section 3.2.3.1 (b))
f. The program must contain material that provides a structured learning experience to facilitate a smooth transition to professional practice or, in the case of programs targeting a research role, further study in the discipline.). (Section 3.2.3.1 (d))
g. Work integrated learning is encouraged by the accreditation process and is part of many ICT programs. However it is not practical to make it mandatory given the difficulty of finding work placements for all students in ICT programs. (Section 3.2.3.6)
h. Graduates should have obtained relevant knowledge which will assist them in being both innovative and entrepreneurial.). (Section 3.2.3.1 (i))

4.) Demonstration of autonomy and independence of the graduates

i. The structure of a program should clearly promote a graded transition of learning experiences from a more directed beginning to a more independent learning approach in the final year). (Section 3.2.3.1 (g))

6. VERSION HISTORY

AUTHORS

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VERSION HISTORY

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