Information Systems and Technology Accreditation Council

Accreditation Criteria

for

Bachelor of Computing/Information Technology/Systems/Applied Degree Type Programs

TABLE OF CONTENTS

PREAMBLE

These guidelines are written to provide assistance to faculty and administrators involved in the accreditation of Bachelor of Computing/Information Technology/Systems/Applied Degree type programs. They specify the objectives of accreditation, the various steps in the process, and the essential and highly desirable qualities of accreditable programs. Questions and suggestions for improvements may be sent, either directly or through the CIPS National Office – accreditation@cips.ca

POLICIES

1. Program Identification

To assess relevant post-secondary educational programs for accreditation. The institution is responsible for identifying the program(s) which is/are to be assessed. A program is normally identified as such within the Calendar of the institution, and should be characterized by a curriculum that is regarded and promoted as an entity by the institution, and which may be considered independently. Programs undergoing accreditation may contain options and/or electives, and it is the responsibility of the institution to identify all such options and electives within a program to be assessed. In assessing a program for accreditation, Information Systems and Technology Accreditation Council will examine all such options and electives within the program, and will accredit a program only if all such options and electives meet the criteria.

2. Educational Mandate

To accredit programs that will: a) prepare a student to take advantage of as many different employment opportunities as possible; b) contribute to the needs of Canadian society both in the near and long term; c) prepare students for life-long learning.

3. Voluntary Accreditation

To invite institutions to submit programs for consideration without persuasion or pressure.

4. Accreditation Eligibility

To accredit a program only if students have graduated from that program. However, a request for an accreditation of new program may be undertaken during the final academic year of the first graduating class. The accreditation visit will then take place after the first graduating class has completed the final academic year. Accreditation of a new program is granted only if and when students graduate from the program in the year in which the accreditation visit takes place. The effective date of such accreditation will include the first graduating class. Should the program fail to produce graduates in the academic year of the visit, accreditation will be denied.

5. Program Expectations

To assess qualitative as well as quantitative factors in making an accreditation decision. This should be implemented by a visit to the institution by a competent committee, having suitable qualifications.

6. Accreditation Denial

To deny accreditation to programs that omit instruction in a significant portion of a subject in which Information Systems and Technology professionals may reasonably be expected to have competence.

7. Accreditation Criteria Guidelines

To avoid rigid standards as a basis for accreditation in order to prevent standardization and conservatism, and to encourage planned experimentation.

8. Accreditation Term

To accredit satisfactory programs for a full term. Under exceptional circumstances, accreditation may be granted for a shorter term. The shorter term accreditation decision will include what specific areas of concern need to be addressed before full

accreditation is granted. The shorter term assessment methods will include either the review of a report submitted by the institution or a visit by an accreditation team. It is expected that the institution will take action to bring the program into full compliance with the criteria.

9. Non-compliance to Criteria

To revoke accreditation if institutions do not continue to comply with established criteria. If it appears that an accredited program is not in compliance with the criteria, then the institution is so notified. If the response from the institution is not adequate, then the Council will institute procedures to determine the actual status of the program in question prior to making any decision with respect to the revocation of accreditation.

10. Appeal of a Decision

To provide means for reconsideration.

11. Publication

To publish and maintain a list of accredited programs. Information such as to whether a program not on the accredited list had been under consideration by the Council will not be made available except to the appropriate officials of the institution offering the program.

To inform an institution that is must not simultaneously use the same program title to identify both an accredited program and a non-accredited program.

12. Confidentiality

To maintain the confidentiality of the report produced as a result of the accreditation effort. Also, any accreditation related materials, which are not already in the public domain, are regarded as confidential.

13. Privately Funded Programs

ISTAC will consider the review and accreditation of privately funded educational institutions if the program has satisfied the following conditions:

a) Received provincial government recognition involving institutional recognition/accreditation and a program specific review recognition/accreditation and continues to meet the province's guidelines for continuing the recognition.

b) Is a baccalaureate degree program that is a minimum of 3 academic years in length (or equivalent to six full course load terms) and the C.I.S. /C.I.T. specific course content of a program is a minimum of 60% over three academic years.

Note: All programs requesting accreditation will be reviewed by ISTAC's existing accreditation criteria. No changes or exception will be made to these criteria to accommodate special needs or requirements that exist in privately funded educational institutions.

METHOD OF EVALUATION

Programs submitted for accreditation will be evaluated on the basis of data submitted by the institution in the form of a questionnaire and other supporting documentation, together with the report of an on-site visit by a carefully selected team representing the Council. The purpose of the site visit is three-fold.

1. First, the site visit should assess factors beyond those described in the questionnaire. The intellectual atmosphere, the morale of the faculty and the students, the calibre of the staff and the student body, and the character of the work performed are examples of intangible qualitative factors that are difficult to document in a written statement.

2. Second, the visiting team should help the institution assess its weak as well as its strong points.

3. Third, the team should examine in further detail the material compiled by the institution and relating to:

4. Control and organization of the institution.

5. Education programs offered and diploma or degrees conferred.

6. The basis of and requirements for admission of students.

7. Number of students enrolled:
    i. in the college, faculty or division as a whole,
    ii. in the individual educational programs.

8. Teaching staff and teaching loads.

9. Commitment to and support for research.

10. Resources:

    a. financial: total budget, non-salary portion of budget and salary scales,

    b. physical: classrooms, laboratories, equipment and offices,

    c. support staff: administrative, clerical, laboratory, research and technical,

    d. reference material: electronic resources such as the IEEE and ACM digital libraries.

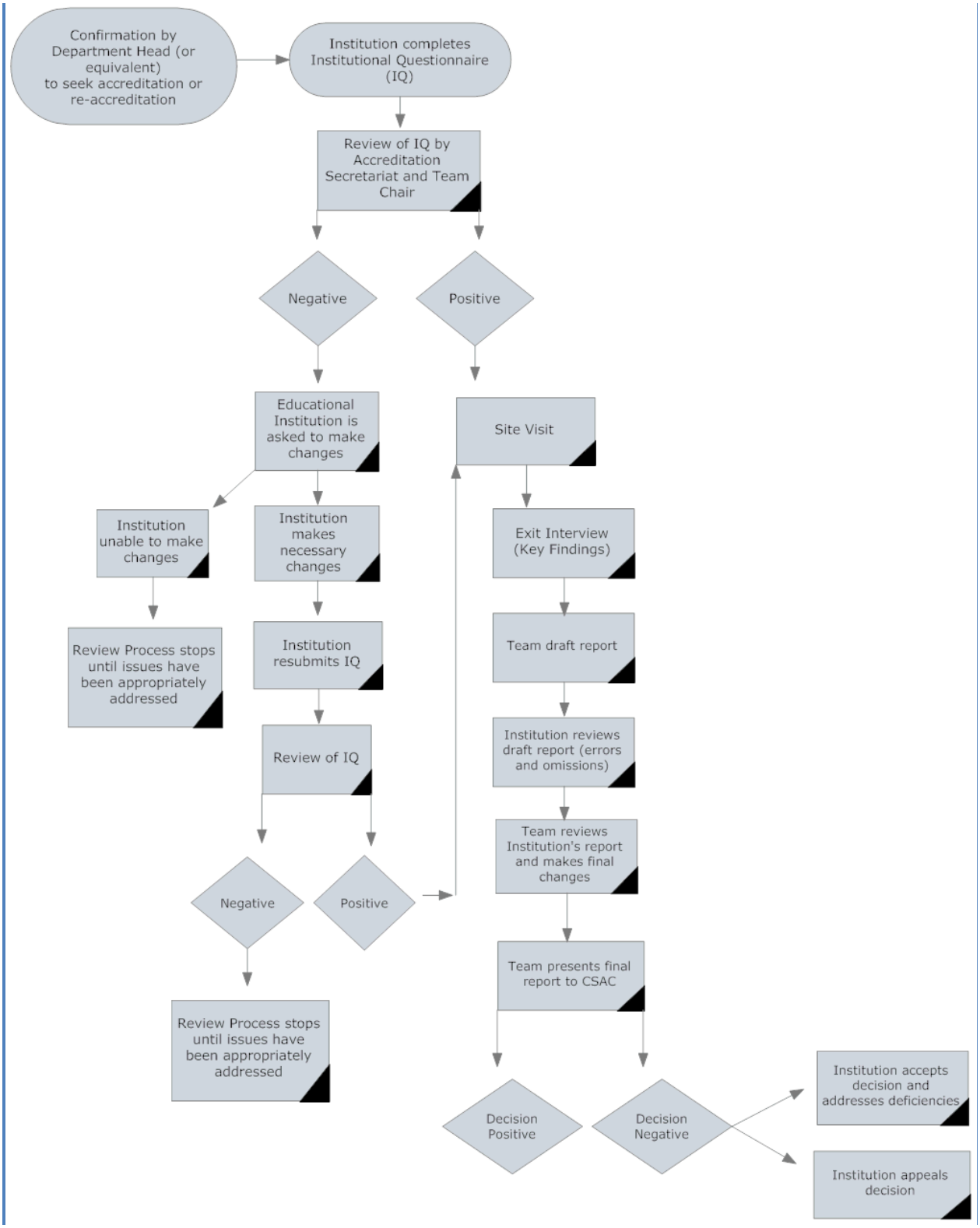
11. Curricular content of the program.

12. Actual course selections, as reflected by a sample of anonymous transcripts.

13. Innovative and special features of the program.

14. Institutional policies and support

ACCREDITATION PROCESS



FACULTY

The capability of any program to provide high-quality education or training is ultimately dependent upon the background and dedication of the faculty members. A competent and dedicated faculty can provide a good program in spite of deficiencies in other areas such as physical resource availability. However, excellent resources and facilities cannot compensate for insufficient or poor-quality staff. It is therefore important that a school seeking accreditation for a program has allocated the resources necessary to provide sufficient numbers of high-quality faculty and is committed to maintaining the allocations necessary for the continuation of high quality program delivery.

Faculty members should embody the technical skills and business knowledge found in the geographical area to be served by the program as well as those common to the business community in general. Factors to be considered in this assessment include academic background, pedagogical credentials and experience, and the related business experience of the instructional and administrative staff. There should be a broad range of knowledge and experience sufficient to provide expertise in all areas of the program's curriculum. It is the expectation of accredited programs that all faculty possess formal qualifications in Computer Science, IS, IT, Computer Engineering or a closely related discipline. The faculty profile should also reflect a balance of credential levels, including undergraduate and graduate degrees.[1]

The size of the faculty will depend on the enrolment, number of student contact hours per week, method of instruction, program objectives, and the existence of any additional tasks assigned to the staff. This number of instructional staff should be sufficient to provide an instructor/student ratio that facilitates interpersonal contact between the instructors and their students. There should be a policy for adequate student/instructor contact for problem resolution as well as for instructional purposes.

The school should support and encourage professional development opportunities for its instructional staff. These opportunities should include formal training in pedagogy as well as opportunities for further discipline-related study at the post-secondary level. The provision for permanent employment status for the instructional staff should be in place in order to ensure program continuity and stability. As it is important that instructors remain abreast of technological and information processing developments, there should be a provision for the periodic upgrading of technical skills used by the faculty and staff. This upgrading should be planned to precede alterations to the curriculum rather than to be conducted on a parallel basis. Evidence of this commitment would be encouragement to participate, time allotment, and resources for staff involvement in industry activities, business seminars, professional associations, meetings and information exchanges.

Sabbatical and professional development leaves, as well as faculty exchange programs, provide the opportunity for individuals to develop professionally and to gain an additional breadth of experience. Such programs would also be considered an asset.

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[1] National Guidelines and Expectations for Faculty Teaching IT related courses

1. Faculty members have academic and work experience credentials* better than the credential and work experience expectations of the students upon graduation;
2. IT faculty members, including lab assistants, hold a first diploma or degree in Computing or closely related field;
3. A significant percentage (typically 30% or more) hold graduate degrees in Computing or a related field;
4. IT faculty members have at least 2 years of full-time IT related industry experience (other than teaching);
5. A significant percentage (typically 50% or more) have a minimum of 5 years of senior full-time IT related experience;
6. Exceptions:

- Faculty who possess their CIPS I.S.P. or ITCP designation.
- Mature faculty who do not have formal credentials, but learned "on-the-job" and usually have a significant number (10 or more) of years of full-time IT related industry experience.
- Mature faculty who do not have formal credentials, but who do have an appropriate combination of vendor specific credentials and significant (typically 5 years or more) of senior full-time IT related experience.

* Work experience is defined as professional level experience including working in nontrivial, complex project planning, analysis, development and implementation areas, including all phases of the system development cycle.

FACILITIES AND RESOURCES

For a program to be accredited there must be evidence of an ongoing commitment by the school to maintain and modernize the physical and support aspects of the instructional environment. The physical environment should be adequate to provide for learning. Classrooms and laboratories should be clean, well ventilated, and adequate to house the students and hardware. Staff should have sufficient space in their offices or meeting rooms for student consultation. The availability of computer resources for scheduled laboratory class hours and open labs
for after-hours access is essential to a program in computer studies. The computer hardware facilities should be representative of the environment where students will be employed upon graduation. These computational facilities (especially terminals and microcomputers) should be readily available to the students for the completion of out-of-class assignments. The number of units available in the open labs should allow for reasonable student access during the normal operating hours of the day.

Software provided and used within the program should be representative of commonly encountered business software in use in the community and should provide for the full spectrum of applications. There should be generalized business application software as well as technical software available to the students. Consideration should be given to the acquisition of software which embodies tutorial and help facilities as an integral part of its package. Reliable and fast response to hardware and software problems is a requirement to ensure that an optimum number of units are always available to the students and staff. There should be provision for a maintenance plan, and technical support staff to assist students and staff with software and hardware problems, and with the setup of student exercises.

Access to technical information and documentation must be readily available. Alternative types of delivery should be available for use in order to enrich the program delivery. The program must have adequate administrative support and services that are consistent with the faculty size and student population. These services should handle clerical duties for the instructional staff. Services for students should also be provided, perhaps for a fee, for
duplicating, typing, etc.

ADMINISTRATION, PLANNING AND INTERNAL PROCESS

There should be a budget provision and a plan for updating equipment and software on a regular basis. Procedures for the disposal of obsolete equipment should also be in place. Planning for equipment should be consistent with student enrolment and other uses of the facilities such as continuing education classes and special courses and seminars. A documented process must be in place to assure continuity and sustainability of ongoing
program quality and currency. A capable administration must be in place that understands the special needs of a technical program. Planning (long and short term, operational and strategic) must take place at all levels, and a
monitoring and feedback process must be present. Policies and procedures must be formally documented.
The process for ongoing curriculum renewal must include the gathering of data from a variety of sources to inform the curriculum renewal process; including feedback from graduates and industry.

STUDENTS

A good school should be able to recruit and retain good students. The documentation provided to prospective students must accurately and realistically describe the program qualification standards, applicant selection methods used, and workload required to be successful in the program. Career opportunities and employment prospects provided through successful program completion should be described in realistic terms and must be reflective of current employment realities.

Sound student retention policies and practices are indicative of a student-centered institution. The students must not feel that the regulations of the organization hamper them from the attainment of a useful and beneficial education. Student involvement in the operational side of the school provides an opportunity for students to understand the workings of the organization as well as to provide them with the opportunity to express their views. Student government and student representation on various standing committees within the school provide this avenue. In addition, the student body should be provided with a well rounded set of socio-recreational activities to assist in the development of a healthy lifestyle. Academic and personal counseling services should also be provided to assist the students with career choices as well as with the resolution of problems of a personal nature. Graduate placement services should be available to assist the students to facilitate their transition
from the academic environment to that of their chosen field. An alumni association can provide a valuable link between the school and its population of graduates. Such an association can provide the school with follow-up information on the various programs, placement assistance for new graduates, and generally promote the programs within the community.

INDUSTRY SUPPORT

An important feature in the success of an information systems program is the interaction between the school and the local business community. A good interaction means support from industry and advice for the instructional staff. This interaction can take many forms, but the most common are:

- An advisory committee made up from a cross-section of local business representatives; such a committee can keep the school aware of current trends in hardware, software, and skill requirements, as well as to inform the local community of the current activities of the academic world;
- Visits to local businesses where the faculty and/or students are provided with exposure to real life situations not only from the information systems point of view but also involving the various functional areas of business such as marketing, manufacturing, finance, etc.
- Guest lecturers from a variety of business and industry backgrounds can also be used to provide faculty and students with a valuable insight into the realities of the working world; and
- Co-op and work-term projects which facilitate student involvement in a program-related activity in a real business setting are highly desirable. Such activities are not only beneficial to the students, but also to all groups involved. Industry representatives have the opportunity to assess the skill-level of potential employees and to acquire a better knowledge of the skills embodied in the graduates.

Through this interaction the faculty members become more conscious of the requirements of industry and the various areas in which their graduates will become employed. Finally, the school could receive access to hardware and software resources which would not otherwise be available to its students and faculty.

INNOVATION AND RESEARCH

Although research is not usually considered to be mandatory for a school to fulfill its mandate, such an involvement can be considered indicative of an ongoing commitment to innovation and excellence. This innovation could take the form of the devising of new pedagogical approaches, or the development of new course notes and manuals. Research work could be evidenced through the personal involvement of faculty members in the use of computers, or in their collaboration with local businesses, university or government research centers.

CURRICULUM

GENERAL CURRICULUM

The curriculum must serve the needs of students, employers and the community. Accredited programs should allow all these stakeholders the opportunity to provide an influence on the curriculum and to ensure that graduates are qualified for information systems related employment.

Students enrol in the programs for various reasons: to build upon existing skills and knowledge, to establish entry-level qualifications, or to facilitate a transition from one career to another. Accredited programs should cater to this variety of objectives.

The information systems area is an integral part of the operation of most organizations and the ability to maintain stability of operation and to establish a competitive position is dependent on the successful partnership of the information systems area with the other functional areas of the organization.

To fully meet the expectations of the information system, a competent IT graduate at the applied degree level must receive training in at least six areas:

1. Organizational or application-related knowledge which provides an appreciation of the environment in which systems are developed and implemented; this can include business, organizational, or the appropriate knowledge related to specific sectors (e.g. health, biotechnology, hardware manufacturing, multimedia, animation etc.).

2. Technical knowledge and computer-based skills which provide the basic foundation of all information systems and information technology functions.

3. Advanced training in technical skills and knowledge as appropriate to graduates at the bachelor level.

4. Significant hands on practice in the application of these technical skills.

5. Interpersonal communication, teamwork, project management, supervisory and professionalism skills which provide the ability to interact in both written and oral form with individuals at all levels within an organization in an effective, productive and professional manner as appropriate to a high technology environment.

6. Liberal arts and general education component to provide the graduate with a broadening perspective on society as appropriate to graduates at the baccalaureate level.

These six components of the curriculum should be highly integrated so that graduates are able to function fully as members of a professional IT team.

The curriculum of accredited programs are expected to produce graduates prepared for positions beyond the typical entry level of a CIPS accredited 2 year Computer Systems Technology diploma program through exposure to a variety of advanced platforms and technologies, courses that significantly contribute to their professional/career development, and exposure to appropriate topics in technology management and workplace skills.

The IT industry requires continuous personal and educational development of IT workers in order to maintain their technical and professional competence. Therefore, the program must be structured to enable and promote life-long learning opportunities. In addition, the program must develop students' abilities in the areas of critical thinking, problem solving and independent learning. While local industry or community needs will impact the content of the program, accredited programs also address prepare graduates to work as IT professionals nationally and even globally. It is recognized that many degree programs seeking accreditation will be based on the curriculum of successful two year diploma programs. The following curriculum criteria can be applied to such programs as well as stand-alone IT degree programs. In light of the dynamic nature of the technical environment associated with the IT sector, accredited programs must be able to react quickly and effectively

to changing skill and knowledge requirements. The Information Systems and Technology Accreditation Council (ISTAC) will review the effectiveness of such mechanisms as established for candidate programs. More specifically, it is expected that the school will have a number of quality control mechanisms in place which will be used on an on-going basis to:

• conduct environmental scans related to both local and national industry trends

• review program objectives and align to industry needs and trends

• evaluate the appropriateness of course content

• evaluate the appropriateness of grading and assessment procedures; and

• monitor the quality of faculty teaching

In light of the dynamic nature of the technical environment associated with information systems activities it is imperative that schools react to changing skill and knowledge requirements with a degree of timeliness which reflects recent technological adoptions by the business community. The Information Systems and Technology Accreditation Council (ISTAC) will review the effectiveness of such mechanisms as established for candidate programs.

CURRICULUM RELATED TO ORGANIZATIONAL AND/OR APPLICATION DOMAIN

The curriculum relating to this component of the program consists of the courses and learning activities which prepare students for the context(s) in which their information systems skills are likely to be applied. These courses and learning activities may include material related to business and organizational aspects, or may provide the appropriate knowledge related to specific sectors (e.g. health, biotechnology, hardware manufacturing, multimedia, animation etc.) These learning activities should therefore reflect the environment(s) in which the application systems are implemented and to which the information systems function provides support and should provide an understanding of the industry sector(s) to which the program is focused.

TECHNICAL CURRICULUM

BASIC TECHNICAL CURRICULUM

The technical components of the curriculum must facilitate development of the skills and knowledge needed by successful computer information technology professional in a wide variety of computing environments. Coverage of these skills and knowledge areas are described at three separate levels as follows. Each level provides the areas and the demonstrable outcomes associated with those areas.

a) The first of these levels involves a foundational understanding of contemporary computer and IT foundations and principles.

The curriculum should include coverage of:

Area	Demonstrable Outcomes
Computer Architecture	Identify computer internal components Identify computer peripherals

	Describe internal computer organization
Internet Applications and Technologies	Design and develop a basic web interface Design an Internet site architecture Utilize or implement an API
Software/Productivity Tools	Utilize application software tools Utilize office productivity tools
Database Management	Demonstrate an ability to use DBMS Identify components of a DMBS
Operating Systems	Identify the function of an operating system Describe operating systems components and relationships
Computer Networking	Identify computer network components Describe a network model Identify network topologies Describe, configure, deploy, and maintain a network.
Programming	Demonstrate algorithm development Implement a programming solution based on a specification Utilize procedural and OO programming languages Implement problem solving techniques using formal design documents Use appropriate programming languages to develop, modify and integrate programs in different platforms Apply knowledge of a variety of techniques to test and debug programs
Standards of Practice	Identify and apply appropriate Bodies of Knowledge Describe applications of Bodies of Knowledge

Curriculum design should facilitate the development of cumulative skills and knowledge in each of the foregoing areas from the introduction of new topics in early semesters up to the eventual development of competency levels normally associated with IT professionals. The design should provide the strong foundational knowledge required for graduates to maintain on-going currency in this field. Accredited programs will also emphasize the practical skills necessary for graduates to apply this knowledge in the workload upon graduation.

b) The second area that the technical curriculum must involve the development of competencies associated with the application systems development process. The objectives of this portion of the program are:

First, to enable graduates to function successfully as technical specialists, programmers/analysts or systems administrators with an understanding of the other activities being conducted by all systems development team members.

Second, to provide the specific skills required to perform as fully functional members of an application development team. The application systems portion of the curriculum should emphasize the following areas:

Area	Expected Outcome
Systems Development Lifecycle	Identify and describe system development life cycles Apply a system development methodology Compare alternate system development methodologies
Data Modelling	Interpret and apply a data model Compare and contrast data model methodologies Create data model diagrams
Process Modeling	Demonstrate an understanding of business process modelling Create process model diagrams
Systems Integration	Outline steps of software application integration Demonstrate exposure to software evolutions
Systems Analysis and Design	Apply principles of SAD Identify and describe different SAD's Analyze and apply standard systems modeling and/or management tools and methodologies Perform feasibility for a proposed system Develop and document business and systems requirements for an application Apply knowledge of a variety of analysis, design, and development concepts and methodologies Demonstrate an ability to use CASE Interpret and apply data and process modelling using structured and Object Oriented approaches Interpret system requirements by using tools such as fact-finding, interviews, document gathering,

	sampling, and research Evaluate strategic alternatives such as: in-house software, acquiring software, or outsourcing
Database Design	Interpret and apply appropriate database design methodologies Differentiate between different database models Apply a model for conceptual data modelling of a database application To identify security issues Analyze and implement database security procedures Perform database table normalization to at least the 3rd normal form Demonstrate how to select, create and alter data from a database Prepare database queries such as joins, sub-queries and unions Apply the use of database triggers to enhance data integrity and security
Quality Assurance and Testing	Demonstrate awareness of the different types of quality controls and their general purposes Distinguish between Quality Control and Testing Interpret testing terminology Plan the testing and evaluation of software systems Prepare a quality assurance plan for a software project

Project Management	Define and describe all elements of project management and associated process methods. Describe the different types of relationships that exist between project activities and their dependencies Create a project charter Create a work breakdown structure, and/or a project schedule Identify problems that will affect the project timelines and recommend an action plan to resolve problems Use project management software
User Support and design of user interfaces	Apply appropriate user interface design principles Create screen and dialogue designs to be applicable to the business settings and purposes of the computer/user dialogue Implement a designed dialogue, with particular emphasis on its need for database or networking needs Code, test, and implement (including user training) the designed dialogue Create templates for an application to ensure consistency of presentation
Security, Network, and Administrative Controls	Describe the goals of information and network security Identify and define key terms and critical concepts of information and network security Determine the security requirements associated with the development and deployment of information systems and network infrastructures Analyze the security risks and describe common security threats Evaluate system threats and attack methodologies and implement measures to safeguard against them Identify and discuss common approaches to cryptography, access control and firewalls etc.

	Assess appropriate security technologies in a network environment or information system to achieve the set security goals and eliminate the identified security risks

c) Third, in addition to the preceding fields of study, familiarization of emerging issues and technologies would provide enhancement to the information systems curriculum.

Topics might include:

- Artificial intelligence
- Network or computer security
- Embedded systems
- Contemporary technologies (proprietary or open-source)
- Advanced topics in programming, database, networking, etc.
- Mobile computing
- Data Warehousing/Data Marts

ADVANCED TECHNICAL CURRICULUM

At the degree level, the technical curriculum is expected to address advanced technical issues, in the form of specialization, advanced theory, and comprehensive coverage. A significant percentage of course work and/or project activity is expected at the advanced level. The opportunity for students to specialize in some area relevant to his or her career or interest would be an asset to the program. This component of the curriculum should strengthen the students' theoretical understanding and comprehension in a variety of subjects related to Information Technology. Simple coverage of a new product, language or methodology is not sufficient to meet the requirements of these criteria.

APPLIED CURRICULUM

A major requirement for CIPS accredited programs at the bachelor level is a systematic and effective component to provide significant hands on and applied experience for the student.

This can be accomplished in a variety of ways including a formal practicum or applied graduating thesis, a work experience component, advanced co-op placement, or applied research activity among others.

This part of the technical curriculum should be a formal part of the curriculum, with appropriate standards and criteria for completion. Involvement of industry in the evaluation of the student's applied skills is highly recommended.

CURRICULUM RELATED TO COMMUNICATIONS, BUSINESS AND DEVELOPMENT OF PROFESSIONALISM

Accredited programs are expected to include the following subject areas in their curriculum which provide for the attainment of business and organizational knowledge:

The major academic objective associated with this group of topics is the development of a knowledge base rather than the development of a specific level of proficiency in the following subject areas:

At the degree level, the academic objective associated with this group of topics should go beyond a general exposure to principles and include the development of management and supervisory proficiencies and skills. This can be accomplished through senior level coursework, significant work-based projects and/or capstone projects in this area.

1	Familiarity with the role and importance of strategic planning, mission, goals and objectives
2	Exposure to the needs of functional areas of an application domain as appropriate such as: finance, HR, manufacturing, production, marketing, distribution, R&D, engineering, accounting etc.
3	Knowledge of how IT is applied within the organizational or application context
4	Skills related to information and requirements gathering techniques
5	Skills that will contribute directly to the needs and goals of the organization in addition to detailed knowledge of the appropriate use of specific computer hardware and software products
6	Skills related to quality control and assurance
7	Knowledge of risk and security management

The expanding and demanding role of modern information systems dictates strong interpersonal and teamwork skills requirements of the IT practitioner. The ability of the graduate to communicate has a direct bearing on the quality of "on-the-job" performance. To facilitate the participation of the graduate in this environment, students are expected to develop the following proficiencies:

- oral presentation and the use of presentation tools: overhead projectors, slide projectors, use of graphics, multi-media
- writing skills: letters, memos, business reports, electronic communications media
- use of productivity software
- interpersonal skills: listening skills, interviewing, analyzing problem situations, team work, leadership, organizational skills
- workplace and employment skills
- interpersonal skills
- customer relations and user support skills
- time management skills
- face-to-face and electronic communications
- remaining current (technical and non-technical)
- training and knowledge transfer
- ethical and legal impact of information systems and emphasize on professionalism[2]

[2] Aspects of professionalism are to be emphasized throughout the curriculum. A specific course or courses in social implications of computing may be offered, but ethical and legal issues surrounding computing, including the social responsibility of programmers and computer users, must be emphasized in courses throughout the program so that students learn that these aspects are part of computing, not merely tangential disciplines. Topics can be covered in a dedicated course or embedded throughout the program. Topics could include:

The program should include curriculum components designed to encourage students to apply these proficiencies throughout their studies. These components may be delivered in courses specifically designed to teach certain of these skills and taught by specialists in the area (e.g. communication or technical writing courses taught by a Communication or English department) or be embedded as a formal component in other courses or learning activities throughout the program.

LIBERAL ARTS AND GENERAL EDUCATION CURRICULUM

Programs at the baccalaureate level are expected to provide graduates with appropriate breadth of knowledge as well as depth. CIPS accredited degree programs should include some liberal arts and general education components as appropriate.

Culture and heritage, culture and technology, global issues (i.e. privacy, surveillance), organizational issues (application of technology, ethical issues in private and public sectors), the law and computer science, safety in software systems, and a review of IT professional codes.

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