



Accreditation of Undergraduate Chemistry Programs in Canadian Universities

1. The Purpose of Accreditation

- 1.1 Accreditation ensures that educational programs have the potential to prepare graduates to practice their profession in a competent scientific manner. It also helps to maintain national standards of education by providing an external audit service for programs, and by promoting the portability of the qualifications of graduates from such programs.
- 1.2 Accreditation should provide a broad basis for the recognition of acceptable degree programs while allowing differing details and breadth in curriculum development. Thus accreditation identifies to the constituent members of the Canadian Society for Chemistry (hereinafter referred to as CSC), and to other interested parties such as provincial professional associations, those undergraduate degree programs whose graduates satisfy the criteria for qualification for membership in the CSC.
- 1.3 Accreditation also fosters cooperation between educational institutions, and provides a medium for the interchange of ideas between universities and industry.
- 1.4 Accreditation will apply to individual degree programs leading to Bachelor's degrees, rather than to the Institution or Faculty. This is based on the premise that degree programs of different characteristics are to be found within the same institution.

2. Procedures

- 2.1 The evaluation of a program is to be undertaken only at the invitation of a particular institution, and will normally be initiated by a letter, to the CSC Director responsible for Accreditation, requesting such an evaluation from the Department Chair or Head. This, or a subsequent letter, must confirm the institution's willingness to provide the appropriate information, to host the Site Visit Team (hereafter referred to as SVT), and to pay the appropriate fee and expenses if applicable.
- 2.2 The duration of the accredited status will be 5 years. The time following the site visit is referred to as 1st cycle accreditation. Subsequent to this, a second 5-year period of accredited status (2nd cycle) can be obtained by submission of the appropriate form indicating any changes to the curriculum. In the absence of any major changes, this re-accreditation can be granted by the accreditation committee without further documentation or a site visit.
- 2.3 The areas to be assessed by the SVT will include:
 - i. the physical facilities of the department;
 - ii. the adequacy of the financial support from the university;
 - iii. the appropriateness of the student : teacher ratios in terms of meeting the stated objectives of the program;
 - iv. the general and professional education of the faculty, their teaching loads and administrative responsibilities;
 - v. evidence of an appropriate commitment to research and teaching activity by the university and its faculty members;
 - vi. the curriculum of the department;
 - vii. the presence of an effective and valid assessment system of student performance;
 - viii. the library, whether separate or within the department, its convenience and accessibility to students, and the appropriateness of the library holdings in the subject. In keeping with modern usage, web access to journals will be considered adequate for accreditation purposes.
- 2.4 Much of the information listed above should be supplied to the SVT before it arrives on campus, so that the members can come equipped with a general picture of the department, its aims and its achievements as these pertain to undergraduate

education. The committee does not wish to constrain a department in any way in terms of the information that it wishes to submit, but the information supplied should include:

- i. calendars and other official program descriptions;
- ii. lists of faculty members with their curricula vitae including information on teaching, research and professional activities;
- iii. a complete list of the course requirements, separate for each program under consideration;
- iv. for each required course, the actual number of class hours, textbook(s) used, copies of past examinations and summary statistics of examination results;
- v. a description of procedures for introducing and implementing curriculum changes;
- vi. a list of actual student laboratory hours for each course involving laboratory instruction;
- vii. a list of instrumentation used by students completing the program under consideration;
- viii. descriptions of any unique features which the institution thinks appropriate

2.5 During the visit, there should be opportunities for face-to-face interviews with administrative officers such as the Dean and/or Academic Vice-President, the Department Head or Chair, the library representative, groups of, or individual, faculty members, and groups of, or individual, senior students, lab personnel and other instructors. There should also be conducted impromptu tours of the physical facilities such as laboratories, libraries, computing facilities, etc.

2.6 Except in the case of international visits which may require a longer stay, a visit will normally take one to two days to complete and will provide an opportunity for the team to assess collectively those factors that cannot be documented in written form.

3. **Guidelines**

3.1 General

A program to be considered for accreditation shall extend over four years, or three in the Province of Quebec for students who have completed two full years of a CÉGEP program; each year to consist of the traditional two terms, or the equivalent if the institution operates on a "trimester" or "quarter" system. The program shall lead to a baccalaureate degree at the educational institution under review.

3.2 Considerations

In considering a program, the primary concern of the Committee shall be the quality of the undergraduate education offered. The curriculum is to be regarded as an important, but by no means the sole component of this. The SVT shall take into account the number and credentials of the members of the faculty who teach in the program and their research or other scholarly interest, and the equipment and facilities available to the students, including library, computer, and other resources. The SVT may also make general enquiries about the success of recent graduates in employment and in graduate schools.

3.3 Limitations

The SVT or the Accreditation Committee shall neither prescribe a detailed curriculum beyond the minimum requirements detailed below nor require uniformity among programs. It shall, however, encourage improvements and examine the breadth and depth of program requirements, and the opportunities for some specialization.

3.4 Requirements.

(NOTE: here and in subsequent sections, a 1.0 credit course shall be considered one which is typically designed to take place over two terms, while a 0.5 credit course is typically designed to take place over one term. A term is typically 12-13 weeks in length. For context, a typical undergraduate degree program in the sciences would be expected to require some 20.0 credits overall, with a student workload of 5.0 credits per academic year).

The core program beyond the first year level shall include the equivalent of 6.0 credits in chemistry, including 0.5 credits in at least three of the five traditional subdisciplines of chemistry (analytical, biochemistry, inorganic, organic and physical chemistry). For pure chemistry programs, at least 0.5 credits in *each* of the five subdisciplines is required. (Departments presenting more specialized or interdisciplinary programs are encouraged to provide the opportunity for students to access 0.5 credits in each of the five subdisciplines.) In cases where courses are in an emerging discipline, an explanation of the chemical components of the course should be described in order for the accreditation committee to evaluate how the course would contribute towards the chemistry count. In addition, there shall be a selection of advanced course offerings to demonstrate a progression of learning within the chemical discipline to bring the total number of hours of instruction up to that described in Section 3.6.

In cases where the accredited program is not pure chemistry, it is recommended that the degree title reflect the nature of the program taken.

3.5 Non-Chemistry courses.

The Committee shall expect a program to include at least 2.5 credits in two or more of mathematics (algebra, calculus, statistics), physics, computer science and biology. In the case of pure chemistry programs, at least 1 credit in each of calculus and physics will be required. The inclusion of other cognate subjects as well as some liberal arts requirements is to be encouraged.

3.6 Hours of instruction. The Committee shall expect a program to involve a total of about 1000 hours of laboratory and classroom work in chemistry, with the minimum hours of each being about 400. The laboratory hours should be distributed in such a way that every student is exposed to meaningful laboratory experience across the subdisciplines. Research-based laboratories, when they are a part of the degree program, should not constitute more than 50% of the required laboratory hours, and no more than 30% of the required laboratory hours may be spent in a fourth year independent research project. In this context, classroom work includes lectures, tutorials, and seminars. In view of the need to provide a broad educational experience to students in accredited chemistry programs, it should not be necessary to exceed this requirement of 1000 hours of chemistry instruction to an unreasonable degree.

3.7 Joint and Interdisciplinary Programs

The Committee shall evaluate the entire program to ensure that the chemistry content is a major part of the program. When the total hours of instruction are equivalent to those specified in item 3.6, and all other items of these guidelines apply, such programs can be awarded full accreditation.

3.8 Integrated Courses

Lecture and laboratory hours in integrated courses, i.e., courses involving some combination of the core subjects (listed in item 3.4), will be proportioned among the core subjects for the purpose of determining whether the requirements listed in 3.4 are met.

3.9 Laboratory work

Laboratory work shall include hands-on training on equipment currently used in research, industry and government laboratories.

3.10 Communications/Teamwork/Ethics.

The Department shall explain to the SVT, with appropriate supporting documentation, how students' communication skills, including the writing of technical reports, are developed and evaluated in that program and they shall be invited to report to the Site Visit Committee on any aspects of the program that (i) address questions of ethical professional behaviour and (ii) are intended to demonstrate a capacity for teamwork among the students.

4. **The Report**

4.1 At the end of the visit, the Site Visit Team will meet to discuss their preliminary opinion on the basis of which the chair of the team will prepare a written report of the program being

assessed, underlining both strengths and weaknesses. A draft copy of the report will then be sent to each member of the team within two weeks of the site visit. After a consensus has been reached, the Chair of the Site Visit Team will send the draft to the Chair/Head of the Department in order to ensure factual accuracy. After correction of any factual errors, the final report is submitted to the Chair of the Accreditation Committee. The Accreditation Committee will then review the final report, and will submit its recommendations to the CSC Board.

- 4.2 The site visit report must include the following components:
- i. an introductory statement recording the dates of previous surveys and the names of the current visiting team members; a list of the previous visiting team's recommendations and accreditation decision should be appended;
 - ii. a description of the curriculum, teaching and research facilities and any observations as to how curriculum changes are effected within the department;
 - iii. a statement describing the faculty and their qualifications, and other relevant information;
 - iv. a statement regarding student achievement standards, as reflected in the data provided by the institution, and as determined by the team based on direct observation;
 - v. a statement describing library facilities, and observations on those by students and faculty.
 - vi. a statement of the RECOMMENDATIONS and SUGGESTIONS, the former referring to areas of critical deficiencies and the latter to non-critical deficiencies.

5. **CSC Board Action**

- 5.1 The CSC Accreditation Committee shall consider the recommendations made by the Site Visit Team and will decide upon one of the following classifications for the program in question.

Preliminary Approval. On the basis of an institutionally prepared prospectus, a new program is granted year by year Preliminary Approval if it appears to meet the minimum requirements for approval as established by the Board, and until such time as students are enrolled in the final year and/or the program has been recommended for Full Approval after a site visit.

Provisional Approval. This classification is granted to a program which has been found to have deficiencies or weaknesses in one or more specific areas, and signifies the seriousness of the deficiencies or weaknesses, which are considered to be of such magnitude that, if not corrected, withdrawal of the program's accreditation status will result. Evidence of significant progress must be demonstrated within one year.

Full Approval. This classification indicates that the program achieves or exceeds the minimum requirements for approval, and specifies that the program has no serious deficiencies or weaknesses, although recommendations or suggestions relating to program enhancement will generally be included in the evaluation report. The Accreditation Committee reserves the right to place term- or other conditions upon any category of accreditation status.

The CSC Board of Directors shall review the recommendations of the Accreditation Committee and ratify its decision.

- 5.2 The Board will normally announce the decision after one of its meetings.
- 5.3 The list of accredited programs will be posted on the Society's web site.

Approved by CSC Board, May 30, 2012