

**Professional Chemist Designation in Canada:
Transferability and Harmonization
of Provincial Requirements**

Final Report

**Prepared by
Dr. Claude Bordeleau, MCIC, chimiste, C. Chem.**

**for the
National Advisory Committee for the
Profession of Chemist in Canada (NACPCC)
and the
Canadian Society for Chemistry**

15 June 2010

Table of Contents

Introduction	3
1 Definition of the Practice of Chemistry	5
1.1 Definitions of scope and/or areas of practice	5
2 Codes of Ethics and Practice.....	8
2.1 Code of ethics published provincially	8
2.2 Code of ethics by the Chemical Institute of Canada	9
3 Membership Requirements.....	10
3.1 Right to title and/or practice.....	10
3.2 Categories of membership	10
3.3 Membership criteria.....	11
3.4 Professional development requirements and/or opportunities	14
3.5 Professional ethics for chemists	15
4 Monitoring Processes	16
4.1 Disciplinary policy or approach	16
4.2 Disciplinary measures	17
4.3 Appeal Processes	17
4.4 Professional Inspections.....	18
5 Observations and Conclusions	19
APPENDIX A – Levels of Recognition	25
APPENDIX B – Membership criteria in provincial associations.....	26
APPENDIX C1 – Disciplinary Procedures Chart (Part 1)	27
APPENDIX C2 – Disciplinary Procedures Chart (Part 2)	28
APPENDIX D1 – Codes of Ethics (Duties to the public)*	29
APPENDIX D2 – Codes of Ethics (Duties to employers and clients)	30
APPENDIX D3 – Codes of Ethics (Duties to members and organization).....	31
APPENDIX D4 – Codes of Ethics by the Chemical Institute of Canada	32
APPENDIX E1 – CSC Accredited Chemistry Programs.....	33
APPENDIX E2 – Chemistry Programs Approved by OCQ.....	36
APPENDIX E3 – Technology Programs Certified by CTAB and OTPQ	37
APPENDIX F – CSC Accreditation Guidelines	38
APPENDIX G – Professional ethics courses in Québec universities.....	39
APPENDIX H – Bylaws amendments for the professional associations.....	42

Introduction

The National Advisory Committee for the Profession of Chemist in Canada (NACPCC) was formed some five years ago with the stated intent of not only raising the profile of the chemical profession, but also of promoting the professional status of chemists in Canada. To this end, it holds regular meetings by teleconference to address several issues, such as transferability of membership across provinces, liability insurance, profession-related courses in universities, and recognition of chemical technologists.

With the official recognition of chemists as professionals comes the use of the reserved title “Chemist,” “Professional Chemist”, “Chartered Chemist”, or any abbreviation thereof. Thus, the NACPCC is working towards establishing “right to practice” authority for chemists across Canada in the context of the national Agreement on Internal Trade (AIT).¹

In May 2009, a meeting of the provincial and national chemistry associations took place at the 92nd Canadian Chemistry Conference in Hamilton. Following this meeting, representatives of the Association of the Chemical Profession of Alberta (ACPA), Association of the Chemical Profession of British Columbia (ACPBC), Association of the Chemical Profession of Ontario (ACPO), Canadian Society for Chemistry (CSC), Saskatchewan and Manitoba chemists, NACPCC, Nova Scotia Chemists’ Society (NSCS) and Ordre des chimistes du Québec (OCQ) all signed a Memorandum of Understanding (MOU).

This MOU outlined the intent of the provincial associations to work together to meet the requirements for the transferability of professional qualifications described in the AIT, and endorsed by the First Ministers in January 2009.

The NACPCC is pursuing several options to achieve its objectives. One such avenue is the establishment of a professional course for chemists. It would cover areas in ethics, scope of practice, safety, and intellectual property useful to chemists in its member associations. ACPA already has in place a system of professional development credits (PDC) as a requirement for renewal of membership. ACPBC has introduced analogous mandatory PDC on all renewals for 2010, in accordance with its bylaws. Another avenue is to ensure national compatibility in academic qualifications, including details of educational requirements that may vary with postsecondary education systems in each province.

A third avenue consists in harmonizing membership criteria between the provincial associations to ease transferability and mobility of chemists. Labour mobility is in fact mandated by the AIT through Chapter 7, which was ratified by all provinces and territories in August 2009. Now, individual provinces have adopted their own version of the AIT, as provincial Labour Mobility Acts. They have also begun reaching agreements with each other in various sectors, such as the Québec-New Brunswick Agreement on Labour Mobility for the Recognition of Qualifications, Skills and Work Experience in the Construction Industry (Oct. 2008), the Ontario-Québec Trade and Cooperation Agreement (Sept. 2009), and the Trade, Investment and Labour Mobility Agreement (TILMA) between Alberta and British Columbia.

The Ontario Labour Mobility Act (OLMA) and TILMA apply to occupational and professional certificates, and they both give a list of professions subject to the Labour Mobility Chapter, including that of chemist. As stated in Articles 5.1 and 5.5 in the TILMA, the parties to the agreement shall “*reconcile their existing standards and regulations that restrict or impair trade, investment or labour mobility*” and they shall also “*cooperate to minimize differences in*

¹ Agreement on Internal Trade (2008). Chapter Seven, Labour Mobility. Available at: http://www.ait-aci.ca/index_en/ait.htm. (Accessed on 10 April 2010).

standards or regulations.” Similarly, Article 12(1) of the OLMA provides that a regulatory body shall “... *take steps to reconcile differences between the occupational standards it has established for an occupation.*”

The NACPCC has established various sub-committees, notably the one on Transferability and Harmonization. Its purpose is three-fold:

- To liaise with professional chemistry organizations in Canada in order to increase awareness of requirements for professional membership and obligations of members in all provinces.
- To establish procedures that facilitate the transferability of membership between provinces.
- To explore harmonization of all aspects of professional membership, consistent with legislation and practice in the individual provinces.

The word “harmonization” appears in the name of the committee as well as in its purpose. This is a word in everyday use amongst regulators and stakeholders with a particular interest in regulatory policy and practice, despite the fact that it is not a word which appears in the Agreement on Internal Trade.

Nevertheless, the AIT provides for a certain kind of harmonization by requiring the recognition of professional qualification of workers from each jurisdiction:

“... any worker certified for an occupation by a regulatory authority of a Party shall, upon application, be certified for that occupation by each other Party which regulates that occupation without any requirement for any material additional training, experience, examinations or assessments as part of that certification procedure.”²

In 2005, a Directive from the European Parliament was introduced for the recognition of professional qualifications. It specifically mentioned the desirability for harmonization:

“In the absence of harmonisation of the minimum training conditions for access to the professions governed by the general system, it should be possible for the host Member State to impose a compensation measure. This measure should be proportionate and, in particular, take account of the applicant’s professional experience.”³

A common argument in favour of harmonization is the facilitation of cross-border movement. At the most basic level, open movement promotes greater economic welfare for the professionals. This presents the main reason for regulatory cooperation. On the other hand, there may be instances where it is more efficient to agree a non-harmonized standard over a harmonized inefficient standard particularly in cases where it is clear that a universal approach to regulatory policy across countries is inappropriate.

² Agreement on Internal Trade (2008). Chapter Seven, Labour Mobility, Art. 706.1.

³ European Parliament (2005). Directive 2005/36/EC of the European Parliament on the recognition of professional qualifications. Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0022:01:en:html>. (Accessed on 10 April 2010).

1 Definition of the Practice of Chemistry

The professional chemist is an individual qualified by professional credentialing and academic and practical education to provide services pertaining to chemistry. The scope of practice of the professional chemist includes those procedures, acts and processes permitted by law, for which the individual has received education and practical experience, and in which he/she has demonstrated competency.

Chemistry is typically divided into several major sub-disciplines, but there are also several main cross-disciplinary and more specialized fields of chemistry. There is much overlap between different branches of chemistry, as well as with other scientific fields such as biology, medicine, physics, and several engineering disciplines. For this reason, it is important to define exactly what chemists do.

As we know, chemists are involved in several aspects of science, from product development and industrial operations to quality control, biotechnology and other applications. They also conduct theoretical, experimental and applied research into basic chemical and biochemical processes. Professional chemists may be found in a wide range of employment situations, and it is impossible to draw up a list that is all-inclusive for their work environment, nor for the range of practice in chemistry.

Chemistry is a dynamic and continuously evolving profession; the listing of specific areas does not exclude emerging areas of practice. At times, chemists may be called upon to perform services for the well-being of the public that are not specifically mentioned in their scope of practice. In such instances, it is both ethically and legally incumbent upon professionals to determine that they have the knowledge and skills necessary to conduct such tasks.

1.1 Definitions of scope and/or areas of practice

The scope of practice described here and the areas specifically set forth describe the breadth of professional practice offered within the profession. Levels of education, experience, skill, and proficiency with respect to the activities identified within this scope of practice vary among individual providers; a professional chemist does not typically practice in all areas of the field. As the various code of ethics specify, individuals may only practice in areas in which they are competent based on their education, training, and experience. However, professional chemists may expand their current level of expertise. Certain situations may necessitate that the professional chemist pursue additional education or training to expand their personal scope of practice.

In the scope of practice for a profession, reserved acts are an important element. However, if a reserved act can be done under supervision, or delegated, the statement should outline limitations regarding where the act may be performed and the degree of supervision that should be exercised.

The meaning of these two terms, delegation and supervision, is explored in detail by Richard Steinecke in his book that undergoes annual updates.

Delegation occurs when the delegating professional makes a determination that an individual is competent to perform a task and that individual then carries out the task without the delegating professional being present. Supervision, on the other hand, implies a more intense control over

*the act than does delegation and will usually require the supervisor's physical presence.*⁴

The scope of practice statement is typically integrated in the legislation that governs the practice of chemistry, such as the *Professional Chemists Act* in Québec, or it is part of the Act of incorporation, such as in Ontario. It can also be defined in a specific regulation, such as in Alberta, or be included in the constitution and/or bylaws such as in Nova Scotia and British Columbia. In those two jurisdictions, the statement is to be used as a model for the development of licensure laws. In British Columbia, the scope of practice statement is part of the application for exclusive right to title submitted under the BC Society Act.

Both the ACPA and the ACPBC use the same definition for the “practice of chemistry”: While not explicitly stated, the intent of the definition is the practice of *professional chemistry*. Such clarification may be advisable.

“practice of chemistry” means

(i) sampling, analyzing, evaluating, interpreting, reporting, advising, training and educating in the chemical sciences,

(ii) the application of chemical sciences including, without limitation, environmental monitoring, industrial chemistry, research, quality systems, laboratory operations and method development, and

(iii) the management of the activities listed in subclauses (i) and (ii);^{5, 6}

The scope of practice for the Nova Scotia Chemists' Society (NSCS) is very much modeled upon those of the ACPA and ACPBC, with minor editing changes:

1.01 Definitions

*n) “practice of chemistry” means sampling, analyzing, designing, evaluating, interpreting, reporting, advising, training and educating in the chemical sciences; the application of those sciences including but not limited to environmental monitoring, industrial chemistry, research, quality systems, laboratory operations, method and system development; and the management thereof;*⁷

For its part, the ACPO defines the term “professional chemistry” in its Act that passed Royal Assent in 1984:

*“professional chemistry” means practising for a salary or fee any of the pure or applied disciplines of chemistry, including organic, inorganic, physical, analytical, metallurgical, theoretical, biological and industrial;*⁸

As for the OCQ, its *Professional Chemists Act* does more than define the scope of practice, it also specifies which areas are outside its purview:

⁴ Steinecke, R. (1995). *A Complete Guide to the Regulated Health Professions Act*. Canada Law Book (updated annually), Aurora, Ontario.

⁵ ACPA (2001). Professional Chemists Regulation (Alta. Reg. 248/2001). Available at: <http://www.pchem.ca/ACPA/BenefitsServices/ProfessionalChemistRegulationAR2482001.pdf>. (Accessed on 10 April 2010).

⁶ ACPBC (2009). Declaration of Professional Practice and Professional Development. Available at: <http://www.pchembc.ca/PDCClaimForm2009.pdf>. (Accessed on 10 April 2010).

⁷ NSCS (2004). Bylaws of the Nova Scotia Chemists' Society. Available at: http://nscs.chebucto.org/NSCS_BYLAWS2004.pdf. (Accessed on 10 April 2010).

⁸ ACPO (1984). Association of the Chemical Profession of Ontario Act (R.S.O., c. Pr10, 1990). Available at: http://www.acpo.on.ca/about/documents/act-84_e.php. (Accessed on 10 April 2010).

*1(b) "practice of professional chemistry" means the practice for gain of any branch of chemistry, pure or applied, including, without limiting the generality of the foregoing, organic, inorganic, physical, metallurgical, biological, clinical, analytical and industrial chemistry, but does not include the execution of chemical or physical tests based on known methods to determine the quality of a product or to control a manufacturing process;*⁹

In the past year, a group of eight professional orders have been identified by the Office des professions du Québec (Professional Board) to review their scope of practice, namely the Orders of Chemists, Agrologists, Geologists, Engineers, Professional Technologists, Architects, Land Surveyors and Forest Engineers. The chemists, agrologists, geologists, engineers, and professional technologists have a more direct interest in the matter even if the Professional Board intends to modernize the scope of practice for each group. All eight Orders have been asked to clarify potential overlaps in the scope of practice of each other. They also have to define which activities are reserved exclusively for a group of professionals and which ones can be shared with other groups.

As a result, the OCQ initiated lengthy consultations with its members in 2009, and held several regional meetings with the objective of writing an updated and more relevant scope of practice for professional chemists. The resulting text has been forwarded to the provincial legislator for inclusion in their Act, but until this is passed, the current definition prevails.

In 2007, the OCQ reached an agreement with the Order of Professional Technologists in Québec to allow a certain degree of autonomy for members of the latter group. This means that professional technologists could perform certain activities that were previously reserved for professional chemists. However, it appears the process of having the appropriate Regulation adopted in the end by the Québec legislature has not yet been completed.

⁹ OCQ (1964). Professional Chemists Act (R.S.Q., c. C-15). Available at: <http://www.canlii.org/en/qc/laws/stat/rsq-c-c-15/latest/rsq-c-c-15.html>. (Accessed on 10 April 2010).

2 Codes of Ethics and Practice

The Hippocratic Oath for scientists was first suggested in 1995 as an ethical code of practice for scientists, to parallel the Hippocratic Oath used in the medical profession.¹⁰ The idea was the brainchild of Sir Joseph Rotblat, the only scientist to have resigned from the Manhattan Project. He conceived it as a means to “*encourage rigour, honesty and integrity among scientists*”, with the main goal to minimize “*any adverse effects their work may have on people, animals or the natural environment.*” He won the Nobel Peace Prize that year for his worldwide campaign to eliminate nuclear weapons.

Unlike some professions, chemists are not registered in a specific discipline. Nevertheless, they are prohibited by their code of ethics from practicing beyond their training and experience. Breaches of the code are often sufficient grounds for enforcement, which may include the suspension or loss of license, as well as financial penalties and now, through recent changes to Canadian law¹¹, could also result in jail time should negligence be shown to have played a part in any incident in which there is loss of human life.

2.1 Code of ethics published provincially

The purpose of a code of ethics is to provide guidelines to ensure that chemists adhere to high ethical standards of practice, especially if they are employee-practitioners. As such, they may be subjected to undue pressure to violate accepted ethical standards of practice based on economic or other considerations. For that reason, the principles expressed in a code of ethics are intended to clarify what constitutes acceptable standards of practice. The applicants for membership in each provincial group must agree in writing to abide by the respective code of ethics.^{12, 13, 14, 15}

Provincial codes are more specific than a code designed merely to guide conscience because they can be used in disciplinary proceedings. This is especially the case for the OCQ code, which is designed as a quasi-legal document.¹⁶ It acts more like a Code of Conduct in that it provides much more specific guidance. The code has a number of discreet headings which cover specific instructions, and give clear and unambiguous direction about appropriate standards of behaviour.

¹⁰ Absolute Astronomy (2010). Hippocratic Oath for scientists. Available at: http://www.absoluteastronomy.com/topics/Hippocratic_Oath_for_scientists. (Accessed on 10 April 2010).

¹¹ Absolute Astronomy (2010). Professional Chemist. Available at: http://www.absoluteastronomy.com/topics/Professional_Chemist. (Accessed on 10 April 2010).

¹² ACPA (2010). ACPA Ethics & Bylaws. Available at: <http://www.pchem.ca/ACPA/EthicsBylaws/EthicsBylaw.html>. (Accessed on 22 April 2010).

¹³ ACPBC (2007). ACPBC Code of Ethics. Available at: <http://www.pchembc.ca/CodeofEthics-approved.pdf>. (Accessed on 22 April 2010).

¹⁴ ACPO (2008). Code of Ethics. Available at: http://acpo.on.ca/ethics-and-by-laws/code_ethics_e.php. (Accessed on 22 April 2010).

¹⁵ NSCS (2004). Code of Ethics. Available at: <http://nscs.chebucto.org/CodeofEthics.htm>. (Accessed on 22 April 2010).

¹⁶ Publications du Québec (2001). Code of ethics of chemists. Available at: http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/C_15/C15R2_01_A.htm. (Accessed on 10 April 2010).

2.2 Code of ethics by the Chemical Institute of Canada

The Chemical Institute of Canada (CIC) is a general association of chemists, including academics as well as chemists working in industry. As such, its code of ethics (see Appendix D4) is less specific about employment practices and more focused on general principles. The codes from professional associations have a somewhat different function. They set out “*duties*” to the public, employers and clients, members and organization, as well as the environment. Some of these duties are described in detail, while others are more generic in nature, such as avoiding conflicts of interest.

The section on “*Duties to the public*” imposes an obligation on chemists to report or notify the appropriate authorities when they see a situation that “*may endanger public safety*”. The CIC code has no equivalent provision.

However, the fundamental principle of “*public welfare*” is prevalent in several codes. For example, the CIC requires that its members “*accept and defend the primacy of public well-being*”, and “*place the health, safety and welfare of all persons, and the reputation of their profession, above any consideration of self-interest.*” Similarly, the codes of the ACPO and ACPBC speak of placing “*the public welfare above any consideration of self-interest*”, and that of NSCS is to “*have the public interest take precedence over all other interests.*”

In September 2009, Gregor Wolbring wrote a thought-provoking article regarding ethics and the research and/or applications in nanotechnology. His main theme centred on the role that CIC members could play in society based on their code of ethics:

“The code of ethics of the Chemical Institute of Canada allows, and some would argue, requires, the CIC and its members in science and technology to have a very visible role in governance, especially if chemicals are involved.”¹⁷

The concern is a valid one, and he goes on to identify which elements of the code could be invoked for that purpose:

“Should chemists, chemical engineers and chemical technologists have been more involved in the nano discourse under the code of ethics points two, eight and ten?”

In practice, should these points, or others from the code, trigger any specific response, any intervention in the public domain by professional chemists? The author wonders about that possibility but seems to believe the duty does exist:

“Although the wording of the code allows for many proactive, innovative, thoughtful, meaningful and well received interventions, reality, it seems, is that the CIC members and the CIC as an organization has not generated much possible and desirable action.”

At first glance, the CIC code of ethics may not appear to be a professional code since its membership is open to “*professional chemists, chemical engineers, or chemical technologists.*” By definition, a professional code applies to members of one profession simply because they are members of that profession. The code states, however, that members of the Constituent Societies are also bound by its commitments. Hence, when the code is applied to the CSC members, it may qualify as a professional code for chemists.

¹⁷ Wolbring, G. (2009). Ethics and nano discourse. Canadian Chemical News, Vol. 61, No.8, pp. 14-18. Available at: http://www.accn.ca/index.php/ci_id/2118/la_id/1.htm. (Accessed on 14 June 2010).

3 Membership Requirements

To be eligible for membership, an applicant must agree to adhere to the requirements established by each individual association. Membership can be terminated by a member's submission of resignation or by decision of the association for misconduct related to failure of a member to follow the prescribed code of ethics, and also for failure to pay dues.

This report examines four specific areas that are directly related to membership requirements: the right to title or practice, the categories of membership, the membership criteria, and the professional development credits. Each area is examined with respect to its conformity with the provisions of the AIT, namely Chapter 7 on Labour Mobility.

3.1 Right to title and/or practice

All five provincial associations (ACPA, ACPBC, ACPO, OCQ, and NSCS) provide a right to title for their members. The details on levels of recognition are summarized in Appendix A. However, only in Québec are chemists required to be members of the professional order to practice chemistry. An exception is made there for academic chemists, as they are not required to be members of the OCQ to carry on professional activities in chemistry within an educational institution.

The ACPBC is the most recent group to undergo registration (May 2007) under the *Society Act* of British Columbia, three years after the NSCS was registered (March 2004) under the *Societies Act* of Nova Scotia. The members of either organization are recognized as Professional Chemists (P.Chem. in Nova Scotia, PChem in BC), but this title is not exclusive. An application for exclusive right to title was made by the ACPBC in June of 2009 under section 10 of the Society Act of BC, and is pending. In addition, the Ministry of the Environment in British Columbia accepts members of the ACPBC, on a case-by-case basis, as Qualified Environmental Professionals (QEP).

The ACPA was first established in 1992 as an Incorporated Society under the *Societies Act* in Alberta. It provides the same title of Professional Chemist (P. Chem.) to its members since the passing, in 2001, of the *Professional Chemists Regulation*, which granted them an exclusive right-to-title.

Similarly, the title of Chartered Chemist (C. Chem.) is reserved for members of the ACPO, as specified in 1984 in the *Association of the Chemical Profession of Ontario Act*.

The exclusive right to hold the title of Chemist or Professional Chemist and to practise the profession of chemistry is conferred to OCQ members under the *Professional Chemists Act* (1964), which requires the Order to supervise the practice of professional chemistry.

3.2 Categories of membership

Qualified professional members of the ACPA, ACPBC and NSCS are registered as professional chemists, and can use the title Professional Chemist (P.Chem. in Nova Scotia, PChem in BC, P.Chem and PChem in Alberta). However, the current practice in Alberta is to use P.Chem. with two periods. The bylaws for all three groups also provide that a professional chemist-in-training shall have the right to the title Chemist-in-Training (CIT). This category of membership is established for chemists who meet the academic requirements but lack the two-year of work experience in a chemically related field.

In addition, the NSCS has a category of Chemical Technologist (Chem. Tech.) for an

applicant who holds a technology diploma in chemical sciences from a college whose program is approved by the Canadian Society for Chemical Technology (See Appendix E3). As with the Professional Chemist membership, entry into the Society is possible as a Chemical Technologist-in-Training when the educational requirements are met but not the 2-year work experience in the practice of chemistry.

The ACPBC and ACPA both have categories of membership for Associate and Student Members. In the ACPBC, Associates are graduates of recognized technology diploma or certificate programs with suitable experience. In the ACPA, any individual interested in the practice of chemistry may join this category. Students enrolled in a BC university or college chemistry program may join as Student Members in the ACPBC, while in the ACPA, the category is open to students enrolled in a university program in the chemical sciences.

The ACPBC also has an Honorary Member category for chemists living in British Columbia who have made a distinguished contribution to the profession of chemistry. Former members of the ACPA, and other regulated Professional Chemists' Associations who have retired from professional practice in chemistry are eligible for the category of Retired Member in the ACPA.

There are three main categories of membership in the ACPO. Full Members are individuals who have satisfied the formal requirements and can thus use the title Chartered Chemists (C. Chem.). Associates are individuals who are working as chemists, or in chemistry-related fields, and are in the process of fulfilling the formal requirements for membership. Student members studying chemistry, biochemistry or chemical engineering in an accredited university program are referred to as Affiliates. In addition, professionals that are no longer practicing chemistry may register as Retired Members.

The OCQ has two membership categories, Chemist and Chemist-in-Training. In addition, the OCQ issues a specialist's certificate to practice the specialty of clinical biochemistry, which allows the use of the title "Clinical Biochemist".

3.3 Membership criteria

Membership criteria vary somewhat with each association, but not to any significant extent. The NSCS requires applicants in its professional chemist category to have a B.Sc. in chemistry (Honours or Major) or graduate degree in chemical sciences "*from a university whose curriculum has been approved by the Chemical Institute of Canada*".¹⁸ This author assumes the italicized part means a program that has been accredited by the Canadian Society for Chemistry. The degree program could be from another educational institution if it is deemed equivalent to an accredited program. In addition, the applicant shall have two years of work experience in chemistry and agree, in writing, to abide by the Society's code of ethics, as specified in the bylaws.

In British Columbia, the bylaws of the ACPBC require full members to hold a four-year B.Sc. in chemistry consisting of at least eight courses of two-term duration each (lectures plus associated laboratory work). Another document further specifies that at least two of the full courses be taken in 3rd or 4th year university.¹⁹ It also requires a minimum of two years of full-time chemistry-related work experience.

¹⁸ NSCS (2004). See Ref. 7.

¹⁹ ACPBC (2009). Criteria for Categories of Membership (updated Aug. 31, 2009). Available at: <http://www.pchembc.ca/MembershipCriteria2009.pdf>. (Accessed on 10 April 2010).

The bylaws do not specify where the B.Sc. degree has been obtained, but the Criteria document states that it needs to be from a “*recognized post secondary program in British Columbia*” unless the Membership and Registration committee deems the degree to be equivalent. A graduate degree (M.Sc. or Ph.D.) in chemistry is also accepted for registration as a professional chemist. The Code of Ethics (Dec. 2007) states that observance of the ethics commitments is a condition of registration (not specified to be in writing) although the Criteria document and the bylaws are silent on the issue. In practice, however, all approved applicants must sign a declaration agreeing to abide by the code of ethics. Membership applications need to be recommended by a registered professional (not required to be a professional chemist).

The ACPA bylaws (2004) establish two categories of membership, i.e. professional chemists and chemists-in-training, but they do not specify what are the criteria. These are specified in the Professional Chemists Regulation (Alta. Reg. 248/2001). Registration as a professional chemist requires a B.Sc. in chemistry from an Alberta University or the equivalent from elsewhere. A graduate degree in chemical sciences is also considered acceptable for the P. Chem. designation.

One can gain further knowledge on the requirements for P.Chem. membership from the Association’s website.²⁰ There, it says the B.Sc. must be a “four-year degree in Chemistry from an accredited University”. Thus, in all likelihood, this refers to those programs accredited by the Canadian Society for Chemistry.

The page also states that, at a minimum, the program consists of “16 single semesters of chemistry with at least two full year courses in 3rd or 4th year university”. Of those, “two semesters must be in each of the four major chemistry disciplines (organic, inorganic, physical, and analytical)”. Here, the word “semester” appears to mean a half-course of a one-semester duration. In addition, the ACPA Regulation requires a period of “24 months of work experience” but only says that it must be “acceptable to the Registration Committee”. The website specifies the applicant must have “two years of full-time chemistry-related work experience”, one year of which must be in Canada.

The Registration Committee may consider a combination of academic qualifications and experience to be substantially equivalent to the formal requirements. It can also register as professional chemists those applicants having passed the Graduate Record Exams (GRE), Chemistry Section provided they have five years of experience in the practice of chemistry.

The above-mentioned website page is silent on the issue of conformity with the Code of Ethics, despite a statement to that effect in Appendix B. There is no mention of this as a requirement either in the Chemists Regulation, the Code of Ethics itself or in the application form. However, the applicant is required in the application to have the form certified by a registered professional (unspecified profession) or a member of the clergy.

The original ACPO bylaws (1963)²¹ state that full members must have an Honours undergraduate degree, or its equivalent from an accredited university program in chemistry, chemical engineering, or the chemical sciences, plus two years of work experience acceptable to the Association.

²⁰ ACPA (2010). ACPA membership. Available at: <http://www.pchem.ca/ACPA/Membership/Membership.html>. (Accessed on 12 April 2010).

²¹ ACPO (2010). Ethics and By-Laws. Available at: http://www.acpo.on.ca/ethics-and-by-laws/by_laws_e.php. (Accessed on 10 April 2010).

The requirements for an Honours Degree are those of the Canadian Society for Chemistry, which is responsible for the accreditation of undergraduate chemistry programs in Canadian Universities. It consists of five full units (450 hours) in the subject areas (general, organic, inorganic, analytical and physical chemistry), together with five lab units (450 hours), and two advanced units (180 hours), adding up to twelve full units, for a total of about 1,100 hours in chemistry.²² Any degree from a non-accredited program shall be assessed by a recognized external organization with respect to equivalency.

Other academic qualifications, e.g. a three-year undergraduate degree with a major in chemistry, and a minimum of five years work experience is also considered for full membership. This must be accompanied by a record of professional competence in the chemical field as evidenced by publications or patents.

Individuals who have at least six years of acceptable experience in the chemical field, but who do not possess the above academic qualifications, may qualify for membership by passing the Graduate Record Examination, Chemistry Section.

Applicants who do not meet these requirements may be invited for an oral interview before the Board of Examiners, who can, if so deemed, present individuals to the Council for consideration based on their exceptional contributions to the science of chemistry as recognized by their peers. Members must adhere to the Code of Ethics (signature to that effect required on the application form), and they are subject to disciplinary action if they commit a derogatory act.

The *Professional Chemists Act* (1964) of the OCQ provides the exclusive right to practice chemistry. In order to be registered as Chemists, applicants must meet all academic requirements and have a minimum of five years' experience in professional chemistry under the supervision of a professional chemist. This requirement may be reduced to two years for those who hold a Québec diploma or one that is deemed equivalent by the Order. Chemists who have not yet achieved the relevant supervised work experience are registered as Chemist-in-Training.

For both categories, applicants must have an adequate knowledge of the French language to practise the profession. However, if that is not the case, they may be issued a temporary permit to practise for one year. This permit may be renewed up to three times with the authorization of the Office québécois de la langue française (Québec French language bureau). Thus, members have up to four years to demonstrate proficiency in French, and each examination is free of charge.

Applicants must submit a written application using the prescribed form or complete it using the online process. They sign the declaration respecting disciplinary and criminal decisions handed down in and outside Québec, pay the annual dues, and take out professional liability insurance with fees under \$20.

The OCQ has set up a Committee on academic training to consider issues relating to the overall academic qualifications giving access to the profession, as well as a Committee of examiners that is charged with evaluating the qualifications of persons who request admission to the Order (See Appendix E2).

These two committees are responsible for advising the Board of directors on the approval of academic programs offered by all universities in Québec, including McGill, which is also accredited by the CSC. The accreditation does not become effective until regulation has

²² ACPO (2010). Membership: Join ACPO. Available at: http://www.acpo.on.ca/membership/folder/ACPO_Application_Folder.zip. (Accessed on 10 April 2010).

been passed by the legislature in Québec. According to Regulation 5.1.01, an approved program consists of the following credits: 12 in physical chemistry, 12 in organic chemistry and 9 in analytical chemistry; also, it has either a minimum of 9 inorganic chemistry or 9 biochemistry credits or a minimum of 12 credits in the two subjects.²³

For all universities, the program must have 55 credits in chemistry with no less than 30 credits in theory and no less than 18 credits in practical work. A course credit is worth 15 hours of class time and a laboratory credit means 30 hours of work, thus giving a *minimum total* of approximately 1100 hours of chemistry content in an approved program.

The OCQ has already implemented a mandatory biochemistry course for most, if not all, approved programs. This has been submitted to the legislature in Quebec, but the process lags behind what exists in practice. The requirement for a biochemistry course is thus in line with the specialist certificate in biochemistry being issued by the OCQ. The inclusion of biochemistry in the CSC accredited guidelines makes sense to synchronize the CSC requirements with those of the Ordre des chimistes du Québec.

For admission as full members (MCIC) of the Canadian Society for Chemistry, candidates must fulfill one of the stated requirements.²⁴ They must hold a B.Sc. or equivalent degree in chemistry, in a program accredited by the Society or have their qualifications approved by the Credentials Committee. (Appendix E1).

When the degree is from a non-accredited chemistry program, the Credentials Committee may judge the program to be equivalent to those accredited by the Society. If not equivalent, candidates will be accepted with at least three years of experience in the profession of chemistry.

If they hold a “Bachelor’s degree in engineering, applied science or a branch of science other than chemistry of an equivalent degree from an accredited program or one approved by the Credentials Committee”, they shall have “at least three years of experience in the profession of chemistry after graduation”.

Candidates can be members of a Canadian “association, order or corporation of chemists”, and have “at least three years of experience in the profession of chemistry”. They may also be graduate students in chemistry or postdoctoral fellows in chemistry whose qualifications have been accepted by the Credentials Committee.

Finally, when candidates do not hold any of those qualifications, they may be admitted if they are recognized authorities on chemistry and have attained a high degree of eminence.

3.4 Professional development requirements and/or opportunities

Although strictly speaking not a membership requirement, some associations have added provisions to the renewal process.

Bylaws of the NSCS state that members will have their membership renewed provided that they submit, with their application, a “statement of professional activities that have contributed to their professional development” and pay the “prescribed renewal fee”.

ACPBC and ACPA members require a minimum of 400 hours of practice in the preceding

²³ Publications du Québec (1993). Regulation respecting the standards for equivalence of diplomas for the issue of a permit by the Ordre des chimistes du Québec (R.Q. c. C-15, r.5.1.01). Available at: <http://www.canlii.org/en/qc/laws/regu/rq-c-c-15-r5.1.01/latest/>. (Accessed on 1 June 2010).

²⁴ Canadian Society for Chemistry (2010). Join CSC. Available at: http://www.chemistry.ca/index.php/ci_id/1695/la_id/1.htm. (Accessed on 12 May 2010).

year (or 1200 hours in the last three years), as well as professional development credits (PDC) to remain in good standing. Members must earn 50 PDCs for renewal of their registration, the credits being valued according to a list of approved activities.^{25, 26}

The ACPO and CIC do not require any specific amount of professional practice beyond payment of the annual membership dues.

All members of the OCQ must maintain and improve their skills as part of the practice of their profession. According to its online application process, the OCQ has a “duty to ensure public protection, in particular by exercising supervision over the practice of professional chemistry by its members”. To that effect, it collects information regarding the continuing professional education of its members, but does not make it a condition for renewal. There is a section on Continuing Education that allows members to set their continuing education profile and update or modify it at any time (see also Section 4.4 Professional Inspections).

3.5 Professional ethics for chemists

In every Québec university, with the exception of Concordia and McGill, the accredited chemistry programs require all students to take a one-semester course in professional ethics (see Appendix G for the courses descriptions). The purpose of this course is to alert students to recognize the ethical problems that may arise in their professional lives, to prepare them to deal with real-world ethical problems, and to help them reflect on the basis of the ethical choices they make.

A typical course may cover topics such as:

- Fundamentals of professional ethics
- Chemist Act and/or Regulations
- Responsibilities to Clients, Colleagues and Society
- Business conduct
- Professional practice issues (credentialing, patents, etc.)
- Health and Safety, Labour, and Environmental Standards
- Risk management, WHMIS concerns
- Intellectual property

A course in professional ethics exists in the chemistry department at Bishop’s University. Their chemistry honours program fulfils the academic requirements for membership in the CSC and the OCQ. However, despite the lack of such a course at Concordia and McGill, the curricula for the Honours programs in chemistry and biochemistry at both universities remain recognized under the existing Government regulation that is still in force.

Interestingly, the School of Architecture at McGill University gives a course in professional ethics as part of its professional program (see Appendix G). The Canadian Architectural Certification Board (CACB) makes it mandatory for students enrolled in the program leading to the professional Master of Architecture degree to take a Professional Practice course.

²⁵ ACPA (2004). Declaration of Professional Practice and Professional Development. Available at: [http://www.pchem.ca/ACPA/Membership/PDC Claim Form 2004.pdf](http://www.pchem.ca/ACPA/Membership/PDC%20Claim%20Form%202004.pdf). (Accessed on 22 April 2010).

²⁶ ACPBC (2009). Declaration of Professional Practice and Professional Development. Available at: <http://www.pchembc.ca/PDCClaimForm2009.pdf>. (Accessed on 22 April 2010).

4 Monitoring Processes

4.1 Disciplinary policy or approach

The code of ethics and disciplinary process applies to all professionals that are members of a given association. This code enables the Board of directors to implement a disciplinary process in the event that someone behaves inappropriately, commits a derogatory act contrary to the code of ethics or to the dignity of the profession, or commits a criminal act.

Rights carry a share of responsibility, more specifically, individuals are responsible for behaving appropriately and in a spirit of collaboration so that the association is able to fulfill its stated objectives.

The results of comparing the disciplinary processes of various regulatory bodies are presented in Appendices C1 and C2. All associations, but one, have a stand-alone code of ethics, distinct from other regulatory documents. For the NSCS, the code is contained as Section 13 of its bylaws. Similarly, the NSCS Discipline Committee (DC) process is described in Sections 3.06 and 12.12 of the bylaws.

The Discipline Committee for the other associations is described as follows: for the ACPO, it represents Article VI(8) of the bylaws²⁷; for the ACPA, it is actually part of the generic professional registration Act rather than the chemists regulation²⁸; for the ACPBC, it is established under the authority of Section 3 of the bylaws²⁹; as for the OCQ, it is contained in the overall Professional Code, amended from time to time, governing every professional order in the province.³⁰

The associations are committed to maintaining high standards of professional practice and ethics, i.e. holding the duty of the profession to the public above the needs of the profession and their members. As such, they have adopted codes of ethics and a set of bylaws. All members of an association must comply with these professional requirements. Also, the associations are obliged to investigate all complaints from members of the public.

Each association has also developed a disciplinary process, in order to enforce its professional requirements, and they all share a similar process. The typical functions of the disciplinary process include:

1. Investigating inquiries and complaints about the professional work of members.
2. Deciding whether the professional requirements of the association have been breached.
3. Applying an appropriate sanction when a member has breached the professional requirements of the association. Fines and legal costs may also be imposed against the member in certain cases. Sanctions may include:
 - a private admonishment;
 - a public reprimand;

²⁷ ACPO (1984). Association of the Chemical Profession of Ontario Act. Available at: http://www.acpo.on.ca/ethics-and-by-laws/by_laws_e.php. (Accessed on 10 April 2010).

²⁸ Alberta Queen's Printer (1985). Professional and Occupational Associations Registration Act. Available at: http://www.qp.alberta.ca/574.cfm?page=P26.cfm&leg_type=Acts&isbncln=9780779737819. (Accessed on 10 April 2010).

²⁹ ACPBC (2009). Discipline Policy. Available at: http://www.pchembc.ca/Disciplinary_Policy_final09.pdf. (Accessed on 10 April 2010).

³⁰ Publications du Québec (1973). Professional Code (R.S.Q. c. C-26). Available at: <http://www.canlii.org/en/qc/laws/stat/rsq-c-c-26/latest/rsq-c-c-26.html>. (Accessed on 10 April 2010).

- a requirement that the member undertake remedial education;
 - a suspension of membership in the association and of the right to use the professional designation; and
 - an expulsion from membership in the association and a withdrawal of the right to use the professional designation.
4. Counselling members who have breached the professional requirements.
 5. Educating members regarding the operation of the disciplinary process.

4.2 Disciplinary measures

Any behaviour deemed unacceptable by a member may be subject to disciplinary action and the case forwarded to a Discipline Committee or Disciplinary Council who will determine whether a sanction should be imposed. If the behaviour reported falls under any of the categories of unacceptable behaviours mentioned above, the procedure described in the Appendices for each association would be applied.

Some professional bodies have to be very strict in applying provisions regulating their profession because these provisions must also cover the right to practice. Such is the case for the OCQ.

Complaints against a member are first sent to the trustee of the order to determine if a hearing before the Disciplinary Council (DC) is warranted. The trustee may also decide on his/her own to lodge a complaint with the DC. The chair of this council must be a lawyer with a minimum of ten years practice and is appointed by the government.

4.3 Appeal Processes

Decisions from a DC can be appealed in all jurisdictions, although the procedure is not defined in detail in the bylaws of the NSCS. The DC for the ACPA or the complainant (and presumably the investigated member) may request the Board of directors to review the decision, stating the reasons for the request, and may further appeal the board's decision at the Court of Queen's Bench.

The ACPO Act of 1984 provides that a person who has been subject to a disciplinary sanction or who has been refused membership may appeal to the Divisional Court of Ontario, which is a branch of the Superior Court of Justice. It hears statutory appeals from administrative tribunals in the province, such as the hearings held by the DC.

As for the OCQ, an appeal suspends the execution of the DC's decisions, except for some that shall be enforceable immediately, as described in the Professional Code. These exceptions are granted whenever there is a substantial risk to public safety or welfare. It is the Professions Tribunal that hears appeals from a decision by the Disciplinary Council.³¹

Typically, an appeal would proceed as follows. After notification, the investigated member is invited to attend a meeting of the appeal committee and is given an opportunity to present his or her case. A friend, counsel or witness may accompany the member.

The investigated member is also provided with a copy of all documents to be considered by the appeal committee. Depending on the circumstances and the nature of the infraction, disciplinary measures may remain in effect pending the outcome of the appeal.

³¹ Publications du Québec (2010). Regulation of the Professions Tribunal (2010 G.O.Q. 2, 737). Available at: <http://www.canlii.org/en/qc/laws/regu/2010-goq-2-737/latest/2010-goq-2-737.html>. (Accessed on 22 April 2010).

After each party has presented his/her case, the appeal committee will decide whether to uphold the decision of the DC. The appeal committee may impose any conditions it deems appropriate relating to the reinstatement of disciplinary measures. The decision of the appeal committee is final and is provided in writing.

Should the investigated member decide not to attend the meeting of the appeal committee, a decision is made in his/her absence and communicated to the member in writing.

4.4 Professional Inspections

A professional inspection, also called practice inspection or practice review, consists in the systematic assessment of a professional's work by one or more persons authorized to do so in order to ensure that it meets established standards and complies with the rules of conduct for the profession. The OCQ is the only professional chemist group mandated to carry out such inspections.

Under Section 23 of the Professional Code (PC)³², "the principal function of each order shall be to ensure the protection of the public". Hence, professional orders must regularly monitor the practice and competence of members throughout their professional lives as a means to prevent and detect problems³³. This task is achieved through of a Professional Inspection Committee that assesses the appropriateness and quality of services rendered and functions as follows:

- It is composed of 7 persons appointed by the Board of directors from among the chemists entered on the roll of the Order for at least 3 years. They remain in office until their death, resignation, replacement or striking off the roll (S. 2.01, Reg. 2.1)³⁴.
- It may be assisted by inspectors, investigators and various experts (S. 112, PC).
- It carries on inspection of their records. If required, it shall inspect the professional competence of members (S. 112, PC).
- It may recommend to the Board of directors that a member be required to successfully complete a period of training or a refresher course. It may also recommend restricting or suspending the professional's right to practice until he or she has fulfilled certain obligations (S. 113, PC).

Since 1987, the OCQ has been conducting its annual surveillance program set up on a five-year rotation, where each year one-fifth of the membership is examined. Each selected member fills out a comprehensive, 28-page questionnaire³⁵ based on the Code of ethics of chemists, the Regulation on the professional inspection committee, and the Professional Chemists Act. It adopts the ISO approach to provide the inspectors with a relevant, coherent and effective document that can serve as an objective communications tool.

³² Publications du Québec (1973). See Ref. 29.

³³ Québec Interprofessional Council (2010). Professional system. Available at: <http://www.professions-quebec.org/index.php/en/element/visualiser/id/7>. (Accessed on 1 June 2010).

³⁴ Publications du Québec (1981). Regulation respecting the professional inspection committee of the Ordre des chimistes du Québec (R.Q. c. C-15, r.2.1). Available at: <http://www.canlii.org/en/qc/laws/regu/rq-c-c-15-r2.1/latest/>. (Accessed on 1 June 2010).

³⁵ OCQ (2010). Grille d'autoévaluation. Available at: <http://www.ocq.qc.ca/DocumentLibrary/UploadedContents/CmsDocuments/Grille%20d'autoévaluation%20professionnelle.pdf>. (Accessed on 1 June 2010).

5 Observations and Conclusions

There are some studies that examine the factors responsible for labour mobility. In a recent study, Ross Finnie estimates a logit model³⁶ of inter-provincial migration and finds that inter-provincial mobility is negatively related to the home province's population size.³⁷

Another research, done by Zhengxi Lin on the same topic, found that the probability of inter-provincial migration depends positively on wage differentials, while personal characteristics and labour market attributes also play important roles.³⁸

Chen and Fougère published a report in 2009 to characterize inter-provincial and inter-industry mobility in Canada on a year-by-year basis between 1994 and 2005. Their analysis reveal, among other things, that regulated barriers significantly reduce the probability of inter-provincial mobility for regulated professions.³⁹

The National Advisory Committee for the Profession of Chemist in Canada (NACPCC) was formed some five years ago with the stated intent of promoting the professional status of chemists in Canada. In May 2009, representatives of several chemists associations or groups signed a Memorandum of Understanding (MOU) to work on harmonizing membership criteria, and thus facilitate the mobility of chemists across provinces.

The importance of recognizing chemists as true professionals has grown steadily since the Agreement on Internal Trade (AIT) was first signed in 1994. The issues then were centred on the clear benefits of allowing free movement of people and goods in Canada, and reducing barriers that restrict trade, investment and labour mobility. They still remain so today.

As a result, these issues are situated in the context of current debates about labour mobility across provincial borders. The body of evidence reviewed in this report provides a strong indication of the social and economic benefits that accrue from the recognition of professional qualifications.

This report carries on a review of the key elements of a professional association, namely:

- Scope of practice
- Code of ethics
- Membership requirements
- Disciplinary process

The comparison of these elements among all of the groups outlined reveals a substantial level of commonalities, and few, if any, real differences. It confirms that mutual recognition agreements could be set up, either on a bilateral or a multilateral basis to allow for full labour mobility of the professional chemists.

³⁶ In statistics, logistic regression (or logit model) is used for prediction of the probability of occurrence of an event by fitting data to a logistic curve. It is a generalized linear model used for binomial regression.

³⁷ Finnie R. (2004). "Who Moves – A Logit Model Analysis of Inter-Provincial Migration in Canada", *Applied Economics*, Vol. 36, pp. 1759-1779.

³⁸ Lin, Z. (1996), "Foreign-Born vs Native-Born Canadians: A Comparison of Their Inter-Provincial Labour Mobility". 11F0019MPE No. 114, Ottawa: Statistics Canada.

³⁹ Chen, X. and Fougère, M. (2009), "Inter-provincial and Inter-industry Labour Mobility in Canada, 1994-2005", Human Resources and Social Development Canada, Gatineau (Québec).

Scope of practice

The ACPA, ACPBC and NSCS all use essentially the same definition for the “practice of chemistry” (see Section 1.1).

As for the ACPO, it defines the term “professional chemistry” as the practice of several listed disciplines in chemistry.

The OCQ, on the other hand, defines the “practice of professional chemistry” in the various branches of chemistry, but excludes the routine “execution of chemical or physical tests based on known methods”, which can be performed by other groups of professionals, or chemical technologists.

All of those definitions are generic in nature, making it difficult to determine the activities that can be done only by chemists, to the exclusion of others. There is definitely a need to review such a definition to reflect the current state of practice in chemistry and also the public interest in the practice of the profession. In other words, one needs to modernize the scope of practice for chemistry. The process used to achieve this goal may take different forms depending on the provincial requirements, but it should take into account some key points.

- Reflect academic and scientific advancements in the practice of chemistry and related professions
- Define concisely the tasks and services appropriately delivered by chemists
- Specify any limits on the scope of practice that may be necessary for public protection
- Examine which activities may be reserved, which may be performed under supervision by chemists, and under what terms and conditions

Code of ethics

Each chemist group abides by a code of ethics covering all three main areas of duties to the public, duties to employers and clients, and duties to members and the organization. They present several points in common in each area, but one group may have added a particular point that others do not have, and vice-versa. This author is showing which points are common and which ones could be examined for possible inclusion.

A) Duties to the public

Common points: protect the public welfare, place the public interest above any consideration, and not be associated with enterprises contrary to the public well-being.

Potential additions: take into account environmental concerns, keep current with changes in the profession, and report any breach of standards that may put the safety of the public at risk.

B) Duties to employers and clients

Common points: only provide services for work that they are competent to carry out, being honest and conscientious in their duties, and not disclose confidential information.

Potential additions: obey the letter and spirit of the law, and take reasonable care of the client's property.

C) Duties to members and the organization

Common points: practice chemistry in accordance with applicable laws, maintain high ethical standards of practice, cooperate with other members, and respect other professionals.

Potential additions: delegate responsibility only to qualified chemists, and properly supervise

non-professionals and subordinates.

As can be seen, the differences between the various codes of ethics are relatively minor. Thus, they are not likely to impede any interprovincial mobility.

Membership requirements

Common point: Qualified members of the ACPA, ACPBC and NSCS are registered as professional chemists, and can use the title Professional Chemist (P.Chem. or PChem).

Potential difference: Members of the ACPO use the title Chartered Chemist (C. Chem.), while members of OCQ use simply Chemist or Professional Chemist with no specific abbreviations.

The professional title for a chemist is not the same throughout the country, but it should present no problem in practice for labour mobility since the person that changes jurisdiction simply assumes the title used in the host province or territory.

Common point: The bylaws for all professional groups provide for a full membership category as well as another of chemist-in-training for those people lacking the two years of work experience in chemistry.

Potential difference: The category of chemist-in-training is referred to as affiliate in the ACPO, but it is not likely to present a real difference.

Membership criteria vary somewhat with each provincial association, but not to any significant extent. However, the relevant data is not available all in one spot. Most of it is found in the provincial associations bylaws but some information is added on the website to clarify a particular point.

Common point: Every association requires applicants in its professional chemist category to have a B.Sc. in chemistry (Honours or Major) from a program that is accredited by the Canadian Society for Chemistry (CSC). If the CSC does not accredit the program, it needs to be recognized as being equivalent.

It should be noted that the OCQ recommends to the Government the accreditation for all undergraduate programs at Québec universities, including those at McGill and Concordia. The CSC also accredits McGill's chemistry programs but the OCQ, through its Committee of examiners, accepts those as being equivalent to its own criteria. Conversely, the CSC recognizes those programs that are accredited through the OCQ.

Potential difference: A graduate degree (M.Sc. or Ph.D.) in chemistry is also accepted for registration as a professional chemist in B.C. and Alberta.

Normally, this should represent a straightforward condition, provided the undergraduate degree was also a major or honours in chemistry. However, a student could in theory enter a graduate program in chemistry from a program with less than the prescribed amount of chemistry for registration in the professional body. In such a case, it would create two classes of chemical professionals. A change in the wording of the requirement would prevent any misinterpretation.

Potential difference: The ACPO accepts an Honours Degree or its equivalent in Chemistry, Chemical Engineering or the Chemical Sciences from an institution accredited by the ACPO. In practice, each applicant submits a list with the number of units taken in chemistry to help the Board of examiners decide if the degree is equivalent to that of an accredited program.

The OCQ being the only group with right to practice, its academic qualifications requirement essentially becomes the standard to follow. Thus, the CSC accredited programs must be shown

in practice to be equivalent to the OCQ requirements. It should be so based on the mutual acceptance of programs by both organizations. However, the wording of the CSC accreditation (see the CSC Accreditation Guidelines in Appendix F) is not entirely specific when it mentions “a total of about 1000 hours of laboratory and classroom work in chemistry”. The OCQ specifies that, for universities outside Québec, the program must have 55 credits in chemistry with no less than 30 credits in theory and no less than 18 credits in practical work. A course credit is worth 15 hours of class time and a laboratory credit means 30 hours of work, thus making a *minimum total* of approximately 1100 hours of chemistry content in an approved program.

Common point: In addition to the academic qualifications, the applicant shall have two years of work experience in chemistry and agree, in writing, to abide by the association’s code of ethics.

Potential difference: In the ACPBC, observance of the ethics commitment is a condition of registration, but the Code of Ethics do not specify if this commitment needs to be in writing. A precision could be added that, after being approved, the applicant needs to sign the Code of ethics before membership is granted.

Potential difference: The ACPA website does not mention conformity with the Code of Ethics, despite a statement to that effect in Appendix B. The Chemists Regulation, the Code of Ethics itself and also the application form are all silent on this issue. An addition is required, perhaps on the website or the application form, to specify this as a requirement.

Potential difference: The ACPA website specifies the applicant must have “two years of full-time chemistry-related work experience”, one year of which must be in Canada.

This represents a more substantial difference, which may be in contradiction with the provisions of the AIT since the Labour Mobility chapter does not require work experience to have been obtained in Canada. Such a requirement would likely need to be harmonized to make it consistent with the AIT.

Potential difference: Of all the provincial associations, only ACPBC and ACPA members require a minimum of 400 hours of practice in the preceding year (or 1200 hours in the last three years). Members must also earn 50 professional development credits (PDC) for renewal of their registration.

The PDCs are not a condition for initial registration, so it should not cause any problems. However, it will have to be determined if the hours of practice requirement represents a substantial difference, and if so, how best to harmonize it with the other groups. As the associations move closer to right to practice, they will need to compare this requirement with the approach to annual monitoring in other professions.

The purpose of a course in professional ethics is to alert students to recognize the ethical problems that may arise in their professional lives, to prepare them to deal with real-world ethical problems, and to help them reflect on the basis of the ethical choices they make.

Again, the OCQ requirement for a professional ethics course as part of the undergraduate program represents the standard to follow. Nevertheless, despite the lack of such a course at Concordia and McGill, the curricula for the Honours programs in chemistry and biochemistry at both universities remain accredited under the existing regulation, which is to be changed. It is recognized that the introduction of new material in the current chemistry programs is an almost insurmountable task. Given this difficulty, the NACPCC is looking to establish a similar course outside the normal curriculum, perhaps as an online offering. Guidance in this area may be provided by looking at the content of the current courses being offered at Québec universities (see Appendix G).

Disciplinary process

The typical process for disciplining a member that has committed a derogatory act (misconduct) is explained fully in section 4.1. It follows a similar path in each provincial group, with some variations in how it is carried out, such as first sending a complaint to the Board of directors, the Registrar or the Discipline Committee or Council (DC). Derogatory acts that are considered by a DC include professional misconduct, incapacity or incompetence, and any such allegations must be made in writing. However, the ACPBC also views that failure to pay fees may be subject to disciplinary action.

Notices to the disciplinary hearing, the hearing itself and the records of such are all similar. As a potential addition to this process, consideration should be given to include a provision on the release of documents to the parties involved after the issue has been determined.

If a member is found guilty of the offence(s), each group provides for penalties ranging from suspension, to loss of membership and expulsion, additional training with costs borne by the member, a fine as well as assessing costs for the hearing.

Overall, the proceedings represent a formal process with all the rigor and prerogatives associated with an administrative tribunal, such as the power to hear evidence, subpoena witnesses, adjudicate costs on the parties, and impose remedial or disciplinary measures. It is a quasi-judicial body that decides in cases where the regulations or bylaws of a professional group affect and harm the lives and property of individuals. For those reasons, special attention must be paid to the legal aspects of the process. However, since ACPBC (and maybe Nova Scotia) is under Society Act, it has removed subpoena and levying costs as powers. It asks members to agree to costs by signature at the outset of the proceedings.

There may be limits to how far a professional regulatory body can restrict the actions of its members. It may not, for example, sanction comments made in a normal political protest on the basis that they would harm the standing of the profession in the eyes of the public. This would likely be found an unjustified infringement on a member's freedom of speech rights.

The professional chemist groups, through their discipline committee, must follow procedures with care in order to act appropriately in disciplining a member. The impact of the disciplinary decision itself must be analyzed to determine whether it infringes upon the constitutional rights of the member disciplined and whether such an infringement can be justified. Ultimately, a regulatory body has every right to deal with professional misconduct cases, or any other actions that are deemed disgraceful, dishonourable or unprofessional.

Bylaws amendments

A list of procedures used to amend the bylaws of each association is presented in Appendix H.

The procedure wording is exactly the same for ACPA and ACPBC. The Board first approves any type of change, but it is not effective until voted on by the members. The vote can take place at any time. In BC, a mail ballot can also be used for bylaw changes.

With the NSCS, members must vote any change by special resolution, but not necessarily at a physical meeting. It becomes in force after approval by the Registrar of Joint Stock Companies.

Council of the ACPO may pass bylaws that are effective immediately, but need to be confirmed at the AGM or at a special general meeting. Before the motion can be considered, a thirty days notice must be given to the members who will need a two-thirds majority to pass it.

The OCQ may adopt any regulation through the Board of directors, but it does not become effective until such regulation has been passed by the legislature in Québec.

The CSC Board decides on changes to the bylaws, but it must seek confirmation or rejection by the members. To that effect, it publishes the proposed changes in the official Journal of the Society at least sixty days prior to its next meeting. The changes are deemed ratified if unopposed by that deadline. Otherwise, the changes are presented for a general vote, and in the absence of any specific mention, a successful vote need only be at a simple majority.

Public register

The ACPA Professional Chemists Regulation mandates the registrar to maintain a register of professional chemists and chemists-in-training, with names and mailing addresses. It does not mention any requirement for access to the register, but the ACPA does post a copy of it with names of members (without the address), their company, city, and membership number.

The ACPBC bylaws (Section 13.06) say the registrar shall maintain a register for each category of membership, but it remains silent on the publication of such register. Nevertheless, the Association publishes a list of all active members, listing their names, cities, companies and registration number as part of its complaints process.

The ACPO Act of 1984 provides for the registrar to keep a register with “names of all members in good standing”, and to allow “examination by the public at the head office of the Association during normal office hours.” There are plans to publish the register online in the near future.

In Nova Scotia, the NSCS treasurer is charged with entering in the register the names and addresses of all members of the Society. There is no indication for public posting of this register.

In Québec, the Professional Code states that the secretary of the Order shall prepare the roll of members, which is public information. The roll contains the name and gender of each member in good standing, the member’s office or employer, address and telephone number of professional domicile, the year of first entry on the roll, every permit obtained, with the date of issue, and a note to indicate if the person has been struck off the roll in the past or if the right to engage in professional activities is, or has been, restricted or suspended. The roll of members can be searched online for a specific member to retrieve the above-mentioned information.

In conclusion, it can be said there remain barriers to harmonization. This is a stepwise process, one that is shaped by multiple organizational and provincial needs. It may well require legislative change and promulgation of new regulations or bylaws.

There must be a clear understanding of the purpose and benefits at all levels, and cooperation between regulatory bodies. The process involves information and experience sharing as well as a wide consultation with the stakeholders. There is room for pilot projects to proceed in progressive and incremental steps that solve practical problems. The tested procedures could then be adopted for wider implementation. The benefits of harmonization can thus overcome resistance to implementing transferability:

- Identify gaps in provincial legislation/regulations and association bylaws;
- Avoid duplication of efforts between associations;
- Reduced burden of meeting membership requirements.

The critical issue for NACPCC is how well it will manage labour mobility. Recently, much has been accomplished in this respect, but drafting of comprehensive provisions for interprovincial mobility remains to be done. The challenge will be to go further in order to transform the scope of professional chemistry in Canada into a truly mobile profession.

APPENDIX A – Levels of Recognition

Criterion	ACPBC	NSCS	ACPO	ACPA	OCQ
Title and Abbreviation	Professional Chemist, PChem Chemist in Training, CIT	Professional Chemist, P.Chem. Chemist-in-Training Chemical Technologist Chem. Tech. Chemical Technologist-in-Training	Chartered Chemist, C. Chem.	Professional Chemist, P.Chem. Chemist-in-Training, CIT, C.I.T.	Chemist Professional Chemist
Current Status	Right to Title, Not Exclusive	Right to Title, Not Exclusive	Right to Title	Right to Title	Right to Title, Right to Practice
Pending	Exclusive Right to Title under Society Act	Exclusive Right to Title and License to Practice under proposed Act to go before the Legislature of Nova Scotia	<i>nil</i>	<i>Nil</i>	New definition for the scope of practice
Basis in Legislation	<i>Society Act of British Columbia</i>	<i>Societies Act of Nova Scotia</i>	<i>Association of the Chemical Profession of Ontario Act</i>	<i>Professional Chemists Regulation</i>	<i>Professional Chemists Act</i>
Other Specified Recognition	Qualified Environmental Practitioner QEP (individual application)	<i>nil</i>	<i>nil</i>	<i>nil</i>	Specialist's certificate in Clinical Biochemistry

APPENDIX C1 – Disciplinary Procedures Chart (Part 1)

Complaint and Disciplinary Procedure		NSCS	ACPO	ACPA	ACPBC	OCQ
Complaint Procedure	Process under current bylaws	Stated in Act: Process in bylaws	Stated in governing POAR Act	Bylaws and published discipline policy (DP)	Disciplinary council established by the Professional Code	
1	Complaints intake process and signed	Not specified. The bylaws state that Council may direct the Discipline Committee to hold a hearing and determine any special allegations of professional misconduct or incompetence, or any other matter, which, in the opinion of Council, requires disciplinary proceedings. It will be used for such allegations to be made in writing. There are occasions when Council may become aware of allegations of misconduct through other means, e.g. newspaper reports.	Signed, written complaints sent to the chair of the Discipline Committee (DC).	Complaints in writing sent to the Registrar.	Complaints must be made in writing and supported by the oath of the complainant.	
2	Complaint Committee – Professional Practice Committee	Standing committee activated as required	Standing committee activated as required. The committee is composed of three members of Council and two individuals who are not members of the Association, but who are members of a recognized technical group. A quorum consists of a majority of members of the Committee, provided that not less than two individuals are members of Council and not less than one member is a non-member of the Association. Council names the Chair of the Committee. A majority vote of members of the Committee is required for action. The Chair has a second or casting vote in the event of a tie.	DC chooses one of its members to act as chair and a member to act as vice-chair. In the absence or inability to act of the chair, the vice-chair has the powers and duties of the chair.	A lawyer is appointed as chair of disciplinary council (three-year mandate) by the Government, the BoD nominates the syndic (trustee) and two other members from its ranks.	
3	Actionable offences	Professional misconduct	Professional misconduct, incapacity, incompetence, or any other matter which, in the opinion of Council, requires disciplinary proceedings. Default in payment of membership fees is not to be considered by the committee.	Conduct that, (a) is detrimental to the best interests of the public, (b) harms the standing of the profession, or (c) displays a lack of knowledge, skill or judgment in the practice of the profession, constitutes either professional misconduct or unskilled practice of the profession.	Acts derogatory to the honour or dignity of the profession, discrimination, sexual harassment, any other acts defined in the Code of ethics.	
Hearing Procedure						
1	Initial complaint analysis process	Examined by the Discipline Committee	The allegations are referred to the Discipline Committee who considers them, hears the evidence and ascertains the facts.	Complaints examined by the DC.	Examined by the Registrar, Discipline Committee; preliminary investigation by third party may be conducted.	Inquiry by the Syndic, complaint then sent to Disciplinary Council if it is founded.
2	Standing Discipline Committee established	Standing committee activated as required	A standing committee; matters are referred to it as they arise.	Standing committee activated as required	Appointed annually; reports to the BoD	Three-year term.
3	Actionable offences	See #3 above	See #3 above.	See #3 above.	After assessment, may be adjudicated as unfounded; member can respond	See #3 above.
4	Hearing Panel: Discipline Committee or other	Hearings conducted if initial analysis finds it necessary	Determines whether upon the evidence and facts ascertained, the allegations have been proven; whether in respect of the allegations so proven, the member is guilty of professional misconduct or incompetence, or is subject to discipline.	If a hearing is held, the chair notifies the investigated member and the complainant stating date, time and place of the DC hearing	Discipline Hearing Panel appointed by BoD (3), one Discipline Committee member	The syndic informs the investigated member and complainant, in writing, of his decision to lodge a complaint or not with the disciplinary council.
5	Availability of oral and written hearings	As required by the committee	The member whose conduct is to be subject of a hearing is advised of the allegations and is permitted to attend the hearing, to be represented by counsel, to question any witnesses who make submissions at the hearing, and to submit evidence and make arguments on his/her own behalf.	The DC and the investigated person may make oral representations and be represented by an agent or counsel at the hearing and subsequent review, if any.	Case-by-case basis, detailed procedures in DP for oral and written hearings, principles of natural justice followed	Any party or witness summoned before the disciplinary council is entitled to be assisted or represented by a counsel.
6	Decision rendered to (which body)	Recommendation of the Board of directors	The Discipline Committee makes its recommendations to the Council of the ACPO.	If a DC is satisfied that a complaint has been proven in whole or in part, it issues an order, as dictated by the circumstances	Panel decision to Discipline Committee for penalty adjudication and recommendation to the BoD	A decision of the DC is enforceable upon being served on the respondent, unless subject to appeal.
7	Record of proceedings	Minutes kept for committee meetings, forwarded to the secretary for records.	Provisions must be made for recording a transcript of the proceedings.	Minutes kept for all committee meetings, sent to the secretary for records.	Proceedings recorded, any party may obtain, at his/her own expense, a transcript of any part of the hearing.	Hearings are recorded, unless parties dispense with it, and are public unless the DC orders that it be held in camera.
8	Release of documents, etc.	Not specified	All documents and other things put in evidence at the hearing shall, upon request of the person who produced them, be released to him/her by the committee within a reasonable time after the issue has been determined.	Not specified	Not specified	Where an appeal of the decision is granted, the secretary of the DC sends a copy of the record (initial complaint, transcript, etc.) to each of the parties.

APPENDIX C2 – Disciplinary Procedures Chart (Part 2)

	Complaint and Disciplinary Procedure	NSCS	ACPO	ACPA	ACPBC	OCQ
	Actions on Hearing Procedure	Process under current bylaws	Stated in Act: Process in bylaws	Stated in governing POAR Act	Bylaws and published discipline policy (DP)	Disciplinary council established by the Professional Code
1	Hearing Panel: Discipline Committee (DC) or other	Board of directors reviews the committee's decision	The Council of the ACPO reviews the recommendations of the DC.	Board of directors reviews the committee's decision	Board of Directors reviews penalty recommendation of the DC	The BoD may order the professional to successfully complete a refresher course, training or both.
2	Decision rendered to (which body)	Decision rendered by the Board of directors	The Council renders its decision based on the recommendations of the DC.	The DC serves its order, with written reasons, on the member, and informs the complainant in writing of the nature of the order.	Penalty confirmed and finalized by BoD	The DC serves its order, with written reasons, on the member, and informs the complainant in writing of the nature of the order.
3	Results published	To the members	This is not defined.	Not specified.	Results posted, public roster of members maintained	The DC secretary sends its decisions to the Office des professions du Québec.
4	Penalties available	Expulsion from the Society	1) If a member's name is to be removed from the Register, the DC advises when the member may reapply; 2) suspension for a determined time; 3) place restrictions on the individual's membership for a determined time as outlined by the DC; 4) reprimand the member and, if warranted, direct that the reprimand be recorded in the Register.	The DC may, by order, a) suspend the registration of the member for a stated period, including the completion of specified studies or supervised practical experience; cancel the member's registration; c) require the member to complete the training it prescribes, as specified in the order.	Loss of membership, professional education or development: costs may be assessed, details in DP; CIT may have a complaint adjudicated as well	The DC imposes one or more penalties: a) reprimand; b) temporary or permanent striking off the roll; c) a fine between \$1,000 and \$12,500 for each offence; d) obligation to remit sums of money to those entitled to it; e) revocation of the permit and specialist's certificate; f) restriction or suspension of the right to engage in professional activities.
5	Role of the Board of directors (ratification)	Final decision	Council makes the final decision.	Not specified, presumed to be ratified by BoD.	BoD has final decision	BoD does not need to ratify decisions taken by the DC.
6	Availability of appeal by subject member	Appeal is available	The member may appeal the membership refusal or the sanction to the Ontario Divisional Court, in accordance with the rules of court.	The DC or the investigated member may request the BoD to review the order, stating the reasons for the request. Parties to the proceedings may appeal decisions of the BoD to the Court of Queen's Bench.	Appeal available	Decisions by the DC may be appealed to the Professions Tribunal.
7	Effective date of penalty	Not specified, presumed to be after service of the order to the member by the DC	Where the DC recommends the removal of a member's name from the Register, this action takes effect immediately following the decision of the DC, regardless of any appeals that may be taken by the member.	Not specified, presumed to be after service of the order by the DC	Not specified, presumed to be after service of the order to the subject member by the DC	An appeal shall suspend the execution of the decision of the DC, except for some decisions that shall be enforceable immediately, as described in the Professional Code.
8	Unwarranted allegations & compensation	If a complaint is frivolous or vexatious, Board may order complainant to pay lawyer's fee advising the Board, incidental expenses incurred by the Society for the hearing.	Where the DC believes the holding of a hearing was unwarranted, the Committee may order that the Association reimburse the member for his/her costs or such portion thereof as the DC deems appropriate.	If the BoD finds that a complaint is frivolous or vexatious, the DC may order the complainant to pay all or part of the costs of the proceeding before the BoD.	Where the DC finds that the complaint is unfounded, trivial, frivolous or vexatious, it issues a report stating the reasons for not holding a hearing, directs the Registrar to notify the complainant and member.	The DC may condemn the complainant to pay the costs if the respondent is acquitted of every charge contained in the complaint and the complaint was excessive, frivolous or clearly unfounded.
9	Return of documents and materials	Upon termination, the member surrenders to the secretary all documents and materials relating to the membership.	When a member's name is to be removed from the Register, the Council instructs the Registrar to do so and to take steps to recover from the member the Chartered Chemist Certificate and Stamp.	Not specified.	Not specified.	Upon appeal of a decision, the investigated member or the complainant can obtain a copy of the record (initial complaint, transcript, etc.)
	Comments					
		The NSCS is currently restricted by the method of incorporation (March 2004) under the <i>Societies Act</i> of Nova Scotia. The new Act, when available, will greatly increase the ability to apply stricter penalties and enforce them.	The Act of 1984 provides for the ACPO to regulate and govern the conduct of its members in the practice of their business or profession by prescribing a code of ethics, rules of professional conduct and standards of practice, and by providing for suspension, expulsion or other penalty for professional misconduct, incapacity or incompetence. The disciplinary process and procedures are outlined in the bylaws of the ACPO.	The ACPA is governed by the <i>Professional and Occupational Associations Registration Act</i> (1985), which has established procedures for the nomination and operation of a Discipline Committee. The <i>Professional Chemists Regulation</i> , passed under the Act in 2001, includes a reserved title provision for ACPA members.	The <i>Society Act</i> of British Columbia (1996) requires that bylaws of ACPBC (incorp. under the Act) contain provisions for the admission of members, and the conditions under which a member may be expelled. The Discipline policy (March 2009) has established a Discipline Committee under the authority of the ACPBC bylaws.	The exclusive right to practise as Chemist is conferred to OCQ members under the <i>Professional Chemists Act</i> (1964). The Act requires the Order to supervise the practice of professional chemistry. The <i>Code of ethics</i> (2001) defines what constitute a derogatory act, but complaints against a member are made pursuant to the <i>Professional Code</i> that sets out the procedure for disciplinary council hearings and appeals.

APPENDIX D1 – Codes of Ethics (Duties to the public)*

	NSCS	ACPO	ACPA	ACPBC	OCQ
	<i>Duties of Members to the Public</i>	<i>Duty of Chartered Chemists to the Public</i>	<i>Duties of Members to the Public</i>	<i>Duties of the member to the public</i>	<i>Duties and obligations towards the public</i>
1	- have proper regard in all his or her work for the safety, health and welfare of the public;		1. have proper regard in all his or her work for the safety, health and welfare of the public.	- have proper regard in all his/her work for the safety, health, and welfare of the public;	8. ensure the services rendered comply with health and safety rules and in respect with the governmental norms of mgmt, warehousing and disposition of the different products used in his field of practice.
2	- protect the public welfare by acting responsibly at all times and by cooperating with government and consumer agencies;	* protect the public welfare through cooperation with government, enforcement and consumer agencies;	2. protect the public welfare by acting responsibly at all times and by cooperating with government and consumer agencies.	- protect the public welfare by acting responsibly at all times and by cooperating with government and consumer agencies;	2. support every measure likely to improve the quality and availability of the professional services in the field in which he practises.
3	- not be associated with enterprises contrary to the public well-being or sponsored by persons of questionable integrity;		3. not be associated with enterprises contrary to the public well being or sponsored by persons of questionable integrity;	- not be knowingly associated with enterprises that act contrary to the public well being and/or enterprises that act with questionable integrity;	3. have a conduct beyond reproach towards every person that make contact with him. In particular, act with courtesy, dignity, moderation and objectivity.
4	- show due diligence in the practice in the profession and demonstrate an effort to keep up to date with its changes;				9. seek to possess an adequate knowledge of existing scientific techniques and their advantages and inconveniences in the field of activities in which he practises.
5	- have the public interest take precedence over all other interests.	* place the public welfare above any consideration of self-interest and resolve any conflicts in favour of the public good;		- place the public welfare above any consideration of self-interest;	7. promote measures of education and information in the field in which he practises.
6		* ensure that environmental and ecological concerns are taken into account in the performance of their duties;		- ensure that environmental and ecological concerns are taken into account in the performance of his or her work;	4. bear in mind the general effect his work may have on the life, health or property of any person, on the quality of the environment and on the whole society.
7		* report to appropriate regulatory agency, without fear or favour, any deliberate breach of standards that may endanger the safety and welfare of the public.			6. where he considers that the work endangers public safety, notify the responsible persons thereof and make the recommendations he deems appropriate.
8					5. ensure the analysed substances that are expired or unused, are safely reclaimed for the purposes of disposition, processing or destruction.

* The OCQ *Code of Ethics* is a 14-page document covering all aspects of the practice of chemistry. The same types of statements exist regarding duties to the public, but there are 66 provisions dealing with duties to the clients, and 24 for duties towards the profession. In addition, another 18 statements cover advertising, graphic symbol of the Order and names on partnerships. Only those clauses matching the ones for the four Associations have been included in the other two tables.

APPENDIX D2 – Codes of Ethics (Duties to employers and clients)

	NSCS	ACPO	ACPA	ACPBC	OCQ
	<i>Duties of Members to their Employers or Clients</i>	<i>Duty of Chartered Chemists to an Employer or Client</i>	<i>Duties of Members to their Employers or Clients</i>	<i>Duties of the member to employers and clients</i>	<i>Duties and obligations towards clients</i>
1	- provide competent and responsible services, and shall only undertake work which he or she is competent to carry out;	* undertake to do only work that they are competent to carry out;	1. provide competent and responsible services, and shall only undertake work which he or she is competent to carry out.	- provide responsible and competent services, and shall only undertake work he or she is competent to carry out;	10. Before accepting a mandate, the chemist shall take into consideration the extent of his aptitudes, proficiency and the means at this disposal.
2	- be honest, diligent and conscientious in the performance of his or her duties;	* be honest, diligent and conscientious in the performance of their duties;	2. be honest, diligent and conscientious in the performance of his or her duties.	- be honest, diligent, and conscientious in the performance of his or her duties;	18. carry out his professional duties with integrity and intellectual honesty.
3	- not be engaged in activities conflicting with his employment, nor accept remuneration for services rendered other than from his or her employer or client, unless his or her employer or client gives written consent to do so;	* advise their employer of possible contraventions of ethical standards of practice and the law;	3. not be engaged in activities conflicting with his employment, nor accept remuneration for services rendered other than from his or her employer or client, unless his or her employer or client gives written consent to do so.	- not be engaged in activities conflicting with his or her employment;	42. The chemist shall safeguard his professional independence at all times and avoid any situation which would put him in conflict of interest.
4	- set fees which fairly reflect the knowledge, skill and time involved in performing services;	* set fees which reflect fairly the knowledge, skill and time involved in performing the professional service;	4. set fees that fairly reflect the knowledge, skill and time involved in performing services.	- set fees which fairly reflect the knowledge, skill, and time involved in performing services;	89 (1,2). In advertising, establish fees or fixed prices for the advertised services, and specify the nature and extent of the services included.
5	- not disclose confidential information without the express consent of his or her employer or client.	* protect trade secrets or information acquired by virtue of their professional capacity;	5. not disclose confidential information without the express consent of his or her employer or client.	- not disclose confidential information without the express consent of his or her employer or client;	49. not disclose that a person has requested his services when such fact is likely to be detrimental to that person.
6		* apprise themselves of the law as it relates to their practice and endeavour to see that both the letter and spirit of the law are obeyed, in the performance of their duties;		- if a potential for a conflict of interest exists, not accept remuneration for services rendered unless the employer or client is informed of the potential conflict of interest and gives written confirmation of having been informed.	22. The chemist shall avoid discriminatory, fraudulent or illegal practices and he shall refuse to participate in such practices.
7		* maintain confidentiality in all matters disclosed by a client;			51. not make use of confidential information to the prejudice of a client or with a view to obtaining, directly or indirectly, a benefit for himself or for another person.
8		* protect the client's property, be it physical or knowledge per se;			26. take reasonable care of the property entrusted to his care by a client and he may not lend or use it for purposes other than those for which it has been entrusted to him.

APPENDIX D3 – Codes of Ethics (Duties to members and organization)

	NSCS	ACPO	ACPA	ACPBC	OCQ
	<i>Duties of Members to Themselves, Other Members and the Society</i>	<i>Duty of Chartered Chemists to other C.Chem, Subordinates and other Professionals</i>	<i>Duties of Members to Themselves, Other Members and the Association</i>	<i>Duties of member to the Association and its members</i>	<i>Duties and obligations towards the profession</i>
1	- practice chemistry in accordance with the laws of Nova Scotia and Canada.	(repeat of point 6 in Appendix D2)	1. practice chemistry in accordance with the laws of Alberta and Canada.	- practice chemistry in accordance with the laws of Canada and British Columbia;	75. If asked by the Order to participate in a council for the arbitration of accounts, a committee on discipline, a professional inspection committee or a revision committee, he shall accept that duty unless he has reasonable grounds for refusing.
2	- present a good image to the public by maintaining high ethical standards of practice and standards of personal ethics that reflect credit to the Society.	* present a good image to the public by maintaining high ethical standards of practice.	2. present a good image to the public by maintaining high ethical standards of practice and standards of personal ethics that reflect credit to the Association.	- present a good image to the public by maintaining high ethical standards of practice and standards of personal ethics that reflect credit to the Association;	87. not use advertising practices liable to denigrate or discredit another chemist or pretend that his services are superior to those provided by his colleagues.
3	- support the Society and further its aims.		3. support the Association and further its aims.	- support the Association and further its aims;	74. Added to those acts referred to in the Professional Code, the following are derogatory to the dignity of the profession (list of 15):
4	- conduct himself or herself towards other members with fairness and good faith.		4. conduct himself or herself towards other members with fairness and good faith.	- conduct herself or himself towards other members with fairness and good faith;	78. in his relation with the Order and the other chemists, behave with dignity, courtesy, respect and integrity.
5	- endeavour to cooperate with other members, and will encourage the ethical dissemination of new methods and technical knowledge.	* willingly impart their knowledge to subordinates & others when appropriate, in order to enhance the overall standard of practice in their profession.	5. endeavour to cooperate with other members, and will encourage the ethical dissemination of new methods and technical knowledge.	- endeavour to cooperate with other members and encourage ethical dissemination of new methods and technical knowledge;	17. practice his profession in accordance with the current professional standards or scientific knowledge; for this, he shall keep up to date and perfect his knowledge.
6	- not deliberately or maliciously attempt to injure the reputation of another member.	* respect colleagues, subordinates and other professionals and not undertake to maliciously or otherwise undermine another's reputation;	6. not deliberately or maliciously attempt to injure the reputation of another member.	- not deliberately or maliciously attempt to injure the reputation of another member.	79. not abuse a colleague's good faith, deceive his trust, be disloyal towards him or damage his reputation.
7	- maintain a high level of competence through continuing education.	* maintain a high level of competence by continuing education throughout their practice;	7. maintain a high level of competence through continuing education.		82. contribute to the development of his profession by sharing his knowledge and experience with his colleagues and students and by his participation in courses and continuing training periods.
8		* delegate responsibility in chemical matters which require professional judgment only to another qualified chemist;			11. at all times recognize the right of the client to consult a colleague, a member of another professional order or another competent person.
9		* properly supervise non-professional subordinates and other non-chemist professionals to ensure that they are not exposed to undue risk in working in a chemical environment;		- properly supervise subordinates to ensure their safety, and properly acknowledge their contributions;	52. ensure his collaborators and the persons under his authority or supervision do not divulge or do not make use of confidential information that may have come to their attention in the performance of their duties.

APPENDIX D4 – Codes of Ethics by the Chemical Institute of Canada

In 1996, the professional association of chemists (Canadian Society for Chemistry), chemical engineers (Canadian Society for Chemical Engineering) and chemical technologists (Canadian Society for Chemical Technology) approved a common code of ethics for the Chemical Institute of Canada (CIC).⁴⁰

Adherence to the following principles is a requirement of membership in the CIC.

As professional chemists, chemical engineers or chemical technologists, the members of the Chemical Institute of Canada and its Constituent Societies undertake:

- To dedicate themselves to the highest standards of personal honour and professional integrity;
- To extend fairness and loyalty to associates, employers, subordinates and employees;
- To accept and defend the primacy of public well-being.

In observance of these commitments, they shall:

1. Practice their professions with honour, honesty, integrity, and dedication to the truth;
2. Encourage and assist others in observing high professional standards;
3. Act responsibly, fairly, and in good faith in discharging obligations to the public, their peers, employers, and employees;
4. Sign and seal only documents that have been prepared by them or under their direct supervision;
5. Accept remuneration and credit only for work performed and professional services rendered;
6. Undertake only such work as they are competent to perform, and express opinions only on the bases of adequate knowledge and honest convictions;
7. Decline to undertake any work that is fraudulent, illegal or unethical;
8. Place the health, safety and welfare of all persons, and the reputation of their profession, above any consideration of self-interest, and resolve any conflicts in favour of the public good;
9. Recognize and declare promptly any conflicts of interest arising from their professional activities; and
10. Seek to promote the understanding of the social and environmental consequences, as well as of the benefits to the public, of the applications of chemistry, chemical engineering, and chemical technology.

⁴⁰ The CIC's Code of Ethics is not on its website, but a copy appears in John H. Woodburn: *Opportunities in Chemistry Careers*. 2nd Ed., Chicago, 2002, pp. 115-116. Available at: <http://books.google.ca/books?id=CwXYs7mmsEsC>. (Accessed on 22 April 2010).

APPENDIX E1 – CSC Accredited Chemistry Programs

Upon invitation to the CSC, its Accreditation Committee carries out the certification of chemistry programs at a Canadian or international university. It also accredits the programs at McGill. For the remainder of Quebec universities, a Committee on training set up by OCQ assesses the chemistry programs and forwards them to the Board of Directors for adoption, who then recommends their approval by the legislature. The CSC recognizes the OCQ approved programs (See Appendix E2).⁴¹

Institution	Program	Approved
Acadia University	BSc Honours Chemistry BSc Major Chemistry	2008–2013 2 nd cycle
University of Alberta	BSc Honours Chemistry BSc Specialization Chemistry	2007–2012 2 nd cycle
University of British Columbia	BSc Honours Chemistry BSc Major Chemistry BSc Combined Honours Chemistry and Biochemistry BSc Combined Honours Chemistry and Biology	2007–2012 2 nd cycle
Brock University	BSc Honours Chemistry BSc Honours Chemistry (Co-op) BSc Honours Chemistry (Research Oriented Co-op) BSc Honours Chemistry-Physics Combined	2005–2010 1 st cycle
University of Calgary	BSc Honours Chemistry BSc Chemistry BSc Honours Applied Chemistry BSc Honours Applied Chemistry Co-op Education BSc Applied Chemistry Co-op Education	2008–2013 2 nd cycle
Cape Breton University	BSc Honours Major Chemistry BSc Major Chemistry BSc Double Major, with Chemistry as the first Major (preliminary approval) BSc Double Major, Hon. Chemistry (prelim. approv.)	2007–2012, 1 st cycle
Carleton University	BSc Honours Chemistry BSc Honours Chemistry (Co-op Education)	2005–2010 2 nd cycle
Dalhousie University	BSc Honours Chemistry BSc Honours Biological Chemistry BSc Major Chemistry	2008–2013 2 nd cycle
University of Guelph	BSc Honours Program Major Chemistry BSc Honours Chemistry with Co-op Option BSc (Technology) in Applied Pharmaceutical Chemistry Honours Biological Chemistry	2005–2010 1 st cycle
King's University College, Edmonton	BSc Chemistry Major	2007–2012 1 st cycle
Lakehead University	BSc Honours (Chemistry Major)	2006–2011 2 nd cycle
Laurentian University	BSc of Science Chemistry	2005–2010 1 st cycle
University of Lethbridge	BSc Major Chemistry	2004–2009 1 st cycle

⁴¹ Canadian Society for Chemistry (2010). CSC Accredited Chemistry Programs. Available at: http://www.chemistry.ca/index.php/ci_id/1891/la_id/1.htm. (Accessed on 12 May 2010).

University of Manitoba	BSc Honours Chemistry BSc Major Chemistry Co-op Option BSc 4-year Majors Chemistry BSc 4-year Majors Chemistry Co-op Option <i>Provisional Approval</i> BSc Honours Biochemistry BSc Honours Biochemistry Co-op Option BSc 4-year Major Biochemistry BSc 4-year Major Biochemistry Co-op Option BSc Honours Chemistry/Physics	2009–2014 1 st cycle
McGill University	BSc Honours Chemistry BSc Major Chemistry BSc Honours Environmental Chemistry Option BSc Major Environmental Chemistry Option BSc Honours Chemistry Materials Option BSc Major Chemistry Materials Option BSc Honours Chemistry Bio-organic option BSc Major Chemistry Bio-organic Option	2006–2011 2 nd cycle
McMaster University	BSc Honours Chemistry BSc Honours Chemistry Biological Specialization BSc Honours Chemistry Physical and Analytical Specialization BSc Honours Chemistry Synthesis and Structure Specialization BSc Honours Chemistry Co-op	2002–2007 1 st cycle
Memorial University of Newfoundland	BSc Chemistry Honours BSc Chemistry Major BSc Joint Honours Chemistry-Earth Science BSc Joint Honours Chemistry-Physics BSc Joint Honours Chemistry-Applied Mathematics BSc Joint Honours Chemistry-Biochemistry	2005–2010 2 nd cycle
Université de Moncton	Spécialisation chimie Majeure chimie	2005–2010 1 st cycle
Mount Saint Vincent University	BSc Chemistry Honours (Joint with Dalhousie University)	2008–2013 2 nd cycle
University of New Brunswick	BSc Honours Chemistry BSc Major Chemistry BSc Honours Chemistry (Co-op)	2009–2014 2 nd cycle
University of Ottawa	Chemistry Specialist Chemistry Major (Provisional) BSc Biopharmaceutical Science (Medicinal Chemistry Option) (Provisional)	2009–2014 1 st cycle
University of Prince Edward Island	BSc Honours Chemistry BSc Major Chemistry (Provisional)	2009–2014 1 st cycle
Queen's University	BSc Honours Major Chemistry BSc Honours Subject Specialization Chemistry BSc Honours Subject Specialization Environmental Chemistry BSc Engineering Chemistry	2006–2011 1 st cycle
Ryerson University	BSc Chemistry BSc Chemistry Co-op Program	2009–2014 1 st cycle
St. Francis Xavier University	BSc Honours Chemistry BSc Honours Chemistry with Biology BSc Advanced Major Chemistry with Biology BSc Advanced Chemistry with Biology (Biochemistry concentration) BSc Honours Chemistry with Computer Science	2009–2014 2 nd cycle

	BSc Honours Chemistry (Geochemistry) BSc Honours Chemistry with Geology BSc Honours Chemistry with Mathematics BSc Honours Chemistry with Physics	
Saint Mary's University	BSc Chemistry Honours BSc Chemistry Major	2005–2010 2 nd cycle
University of Saskatchewan	BSc Honours Chemistry BSc 4-year Chemistry	2009–2014 1 st cycle
Simon Fraser University	BSc Chemistry Major BSc Chemistry Honours	2009–2010 2 nd cycle
Thomson Rivers University, Kamloops, B.C.	BSc Major Chemistry BSc Major Environmental Chemistry	2004–2009 2 nd cycle
University of Toronto	BSc Chemistry Specialist Biological Chemistry Specialist Progr. (Provisional)	2008–2013 1 st cycle
University of Toronto at Mississauga	BSc Chemistry Specialist BSc Chemistry Specialist Biological Chemistry BSc Chemistry Specialist Forensic Chemistry	2008–2013 1 st cycle
Trent University	BSc Chemistry Single Major Honours	2009–2014 2 nd cycle
Trinity Western University, Langley, B.C.	BSc Chemistry Major, Grad. School Prep. Progr. BSc Chemistry, Honours Program	2008–2013 1 st cycle
University of Victoria	BSc Honours Chemistry BSc Major Chemistry BSc Combined Major Chemistry-Biochemistry BSc Combined Major Chemistry-Microbiology BSc Combined Honours Chemistry-Mathematics BSc Combined Major Chemistry-Mathematics BSc Combined Honours Chemistry-Earth Ocean Sciences BSc Combined Major Chemistry-Earth Ocean Sci.	2005–2010 2 nd cycle
University of Waterloo	BSc Honours Chemistry BSc Honours Co-op Chemistry BSc Honours Co-op Biochemistry Honours Biochemistry Honours Biochemistry (Biotech. Specialization) Honours Co-op Biochemistry (Biotechnology Specialization) Honours Chemistry (Materials Chemistry Specialization) Honours Co-op Chemistry (Materials Chemistry Specialization)	2008–2012 1 st cycle
University of Western Ontario	BSc Honours Specialization Biochem. and Chem. BSc Honours Specialization Chemistry BSc Specialization Chemistry	2006–2011 1 st cycle
University of Windsor	BSc Chemistry Major Honours BSc Biochemistry Major Honours	2009–2014 2 nd cycle
York University	BSc Specialized Honours Chemistry BSc Specialized Honours Chemistry – Pharmaceutical and Biological Chemistry	2005–2010 2 nd cycle

1st cycle refers to the first 5-year accreditation period after review with site visit.

2nd cycle refers to the second 5-year accreditation period after reassessment review.

APPENDIX E2 – Chemistry Programs Approved by OCQ

Professional Chemists Act, 1964

10. (1) No person shall be entitled to become a member of the Order unless he

(b) has satisfied the board of directors that he has a minimum of five years' experience or training in professional chemistry under the direction of a professional chemist, or a minimum of two years in the case of the holder of a diploma recognized as valid for that purpose by the Government or deemed equivalent by the board of directors⁴²

Québec Regulation, 1985

1.22. The following diplomas awarded by the educational institutions designated below give access to the permit issued by the Ordre des chimistes du Québec within the scope of paragraph b of subsection 1 of section 10 of the Professional Chemists Act (R.S.Q., c. C-15):⁴³

(Currently under revision to include new programs in place at Québec universities)

Institution	Program	Government Approval
Bishop's University	BSc Chemistry Honours	1985
Concordia University	BSc Chemistry Honours BSc Specialization Chemistry BSc Specialization Analytical Chemistry BSc Specialization Biochemistry*	1985
McGill University	BSc Chemistry Honours BSc Biochemistry Honours PhD Biochemistry*	1985
Université Laval	BSc spécialisé, chimie BSc spécialisé, biochimie* PhD biochimie*	1985
Université de Montréal	BSc chimie BSc biochimie* PhD biochimie*	1985
Université de Sherbrooke	BSc chimie BSc biochimie* PhD biochimie*	1985
Université du Québec à Chicoutimi	BSc chimie	1985
Université du Québec à Montréal	BSc chimie BSc biochimie*	1985
Université du Québec à Rimouski	BSc chimie	1985
Université du Québec à Trois-Rivières	BSc chimie BSc biochimie*	1985

* These diplomas give access to the specialist's certificate issued by the OCQ.

⁴² OCQ (1964). See Ref. 9.

⁴³ Publications du Québec (1985). Regulation respecting the diplomas issued by designated educational institutions which give access to permits or specialist's certificates of professional orders, (1983 G.O.Q. 2, 2369 & 1985 G.O.Q. 2, 31 and 2379). Available at: <http://www.canlii.org/en/qc/laws/regu/1983-goq-2-2369-and-1985-goq-2-31-and-2379/latest/>. (Accessed on 1 June 2010).

APPENDIX E3 – Technology Programs Certified by CTAB and OTPQ

The Canadian Technology Accreditation Board (CTAB) is a standing committee of the Canadian Council of Technicians and Technologists (CCTT)⁴⁴. It is charged with managing the national accreditation program in applied science and engineering technology for all provinces except Québec. A technologist who is certified as a Professional Technologist (PT)/technologue professionnel (TP) from an educational agency within Québec is recognized as certified by the CCTT.

National Accreditation status is active unless otherwise indicated with a hyphen and a closing date, i.e. 1999-2002. The status of some programs may have expired, and then been reactivated via a subsequent evaluation.

Institution	Program	National Accreditation Date
Northern Alberta Institute of Technology, Edmonton, AB	Chemical Engineering Technology	1995
	Chemical Technology	1998
	Plastics Engineering Technology	1994-2002
Southern Alberta Institute of Technology, Calgary, AB	Chemical Engineering Technology	1996
	Chemical Technology	1996
British Columbia Institute of Technology	Chemical Sciences Technology (Environmental Chemistry)	2004
	Chemical Sciences Technology (Industrial Chemistry)	2004
	Chemical Sciences Technology (Pulp and Paper)	2004
Collège communautaire du Nouveau-Brunswick, Bathurst, NB	Technologie de laboratoire de chimie	2005-2008
New Brunswick Community College, Saint John, NB	Chemical Technology	1996-2001, 2003
Sheridan Institute of Technology and Advanced Learning, Oakville, ON	Chemical Engineering Technology	2008
	Chem. Engr Technology – Environ.	2008
	Chemical Laboratory – Technician	2008
	Environmental Science – Technician	2008
Saskatchewan Institute of Applied Science and Technology, Saskatoon, SK	Chemical Technology	2002

In Québec, the following programs are approved by the Ordre des technologistes professionnels du Québec (OTPQ), and are thus recognized by the CCTT⁴⁵:

- 210 Industrial Chemistry
- 210.02 Chemical Engineering Technology
- 210.AA Laboratory Technology – Biotechnology
- 210.AB Laboratory Technology – Analytical Chemistry
- 210.BO Chemical Process Technology

These technology programs are offered at various Colleges or Cégeps, e.g. Dawson College, John-Abbott College, Collège Ahuntsic, Cégep de Jonquière, Cégep de Lévis-Lauzon, Collège de Maisonneuve, Cégep de l'Outaouais, Cégep de Shawinigan, and Cégep du Vieux-Montréal.

To obtain a licence to practice, an applicant shall hold a Québec diploma approved by Regulation, or a diploma deemed equivalent by the OTPQ. Of note, all formerly approved programs still give access to the profession. One should check with the OTPQ registrar's office to see if any new program has been added to the list.

⁴⁴ CCTT (2010). Accreditation (CTAB). Available at: http://www.cctt.ca/landing_4.asp. (Accessed on 1 June 2010).

⁴⁵ OTPQ (2010). Admission - Devenir T.P. Available at: http://www.otpq.qc.ca/admission/devenir_tp/. (Accessed on 1 June 2010).

APPENDIX F – CSC Accreditation Guidelines

Accreditation of Undergraduate Chemistry Programs in Canadian Universities (Extract)⁴⁶

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.

3. Guidelines

3.1 General. A program to be considered for accreditation shall extend over four years, or three in Quebec for students who have completed two full years of a CÉGEP program;

3.4 Requirements. The core program beyond the first year level shall include the equivalent of a one-year course (also known as a “full course”) in at least three of the five sub-disciplines of analytical chemistry, biochemistry, inorganic, organic and physical chemistry, but with a minimum of a one-semester course (also known as a “half course”) in each of these sub-disciplines. In addition, there should be a selection of advanced offerings in the core disciplines and in other subjects such as for instance theoretical chemistry, solid state chemistry, natural products, polymers, advanced instrumentation, research thesis, etc. to bring the total number of hours of instruction to that described in section 3.6.

3.5 Non-chemistry courses. The Committee shall expect a program to include at least one full course (two semesters) in mathematics (calculus), at least one additional half course (one-semester) in mathematics, statistics or computer science, and at least one full course (two semesters) in calculus-based physics. The inclusion of other cognate science 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 in at least four (and preferably five) of the five sub-disciplines. Research-based laboratories, when they are a part of the degree program, should not constitute more than 30% of the required laboratory hours. 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.

⁴⁶ Canadian Society for Chemistry (Nov. 2007). CSC Accreditation Guidelines. Available at: http://www.chemistry.ca/index.php/ci_id/2077/la_id/1.htm. (Accessed on 12 May 2010).

APPENDIX G – Professional ethics courses in Québec universities

Université Laval

*PHI-3900 – Ethics and professionalism*⁴⁷

The professionals of today face situations that require competences of an ethical nature and knowledge that goes beyond the specific technical training specific to their field of expertise. On the one hand, the professionalization is continuously changing, which requires further thought on what are the professional duties and, more precisely, on professionalism. On the other hand, although professional practice is regulated by a code of conduct, professionals are required to view their responsibilities from an ethical point of view. Using case studies and analyses that examine the various issues related to professionalism, the course proposes an ethical reflection on the professional practice and the conditions under which this practice takes place.

(This course is also available as a continuing education course on the Internet)

Les professionnels d'aujourd'hui font face à des situations qui exigent des compétences d'ordre éthique et des savoirs qui débordent les connaissances techniques propres à leur domaine d'expertise. D'une part, la professionnalisation est un phénomène en mutation, ce qui nécessite une réflexion sur le sens de l'activité professionnelle et, plus précisément, sur le professionnalisme. D'autre part, bien que la pratique professionnelle soit réglementée par un code de déontologie, on demande au professionnel d'avoir un sens éthique de ses responsabilités. Au moyen d'études de cas et d'analyses des divers enjeux liés au professionnalisme, le cours propose une réflexion éthique sur la pratique professionnelle et sur les conditions dans lesquelles cette pratique a lieu.

Université de Montréal

*CHM-3521 – Professional aspects of chemistry*⁴⁸

Awareness of the legal, ethical, and safety implications of practising chemistry and the various industry sectors where chemists work.

Sensibilisation aux aspects légaux, d'éthique et de sécurité encadrant la pratique de la chimie et les diverses formes que prend cette profession.

Université de Sherbrooke

*CHM-205 – Ethics for chemists and biochemists*⁴⁹

To know and understand the legal aspects, ethics and code of conduct associated with the practice of chemistry and biochemistry in society. Fundamentals of professional ethics, duties and obligations of chemists and biochemists in the practice of their profession; the code of conduct; closer scrutiny of the laws governing labour and environmental standards; risk management; clinical case studies and examples; issues related to the professional practice of chemists and biochemists.

⁴⁷ Université Laval (2010). PHI-3900 Éthique et professionnalisme. Available at: <http://www.distance.ulaval.ca/fad/cours/PHI-3900.htm>. (Accessed on 12 May 2010).

⁴⁸ Université de Montréal. (2010). CHM-3521 Aspects professionnels de la chimie. Available at: http://www.progcours.umontreal.ca/guichets/progcours/cours/index_fiche_cours/CHM3521.html. (Accessed on 12 May 2010).

⁴⁹ Université de Sherbrooke (2010). CHM-205 Éthique pour chimistes et biochimistes. Available at: <http://www.usherbrooke.ca/fiches-cours/chm205>. (Accessed on 12 May 2010).

Connaître et comprendre les aspects légaux, l'éthique et la déontologie associés à la pratique de la chimie et de la biochimie dans notre société. Fondements de l'éthique professionnelle, les devoirs et obligations des chimistes et des biochimistes dans l'exercice de leur profession; le code de déontologie; approfondissement des lois sur les normes du travail et sur l'environnement; gestion des risques; études de cas et exemples cliniques; enjeux liés à la pratique professionnelle des chimistes et des biochimistes.

Université du Québec à Montréal

CHI-3900 – Professional practice of chemistry and biochemistry⁵⁰

The purpose of this course is to describe the role and the professional obligations of chemists or biochemists in society with specific consideration being given to the potential risks associated with chemical and biochemical substances under their control. Ethics and code of conduct in the professional practice of chemistry and biochemistry. Specific responsibilities found in professional practice arising from the formal labour (Labour Standards, and Health and Safety) and environmental laws. Risk management in the manufacture and handling of hazardous substances. Description of the Workplace Hazardous Materials Information System (WHMIS) and how to use it.

Le cours a pour objectif de décrire le rôle et les obligations professionnelles du chimiste ou biochimiste dans la société en tenant compte de façon particulière du danger potentiel lié aux substances chimiques et biochimiques sous son contrôle. L'éthique et la déontologie dans la pratique professionnelle de la chimie et de la biochimie. Les responsabilités particulières rencontrées en pratique professionnelle découlant des grandes lois du travail (Normes du travail et Santé et Sécurité) et de l'environnement. La gestion des risques dans la fabrication et la manipulation des substances dangereuses. Description du système d'information sur les matières dangereuses utilisées au travail (SIMDUT) et de son utilisation.

Université du Québec à Trois-Rivières

CHM-1012 – Professional aspects of chemistry, ethics and safety⁵¹

This course covers various aspects of the professional life of chemists and of biochemists and provides the required basic knowledge of ethics and safety related to the practice of chemistry. It gives also an overview of the various aspects concerning intellectual property and the securing of patents. Professionalism and ethics of the profession. Notions of hazardous materials and of the Workplace Hazardous Materials Information System (WHMIS). Concept of intellectual property; steps from an idea to invention. Mechanistic and legal aspects of the protection of an invention.

Ce cours couvre différents aspects de la vie professionnelle du chimiste et du biochimiste et il donne les connaissances de base nécessaires d'éthique et de sécurité relative à la pratique de la chimie. Il donne aussi un aperçu des divers aspects concernant la propriété intellectuelle et la prise de brevets. Professionnalisme et éthique de la profession. Concept de matières dangereuses, système d'information sur les matières dangereuses utilisées au travail (SIMDUT). La propriété intellectuelle; de l'idée à l'invention. Les aspects mécanistiques et

⁵⁰ Université du Québec à Montréal (2010). CHI-3900 Pratique professionnelle de la chimie et de la biochimie. Available at: http://www.websysinfo.uqam.ca/regis/pkg_wpub.affiche_cours_desc?P_sigle=CHI3900. (Accessed on 12 May 2010).

⁵¹ Université du Québec à Trois-Rivières (2010). CHM-1012 Aspects professionnels de la chimie, éthique et sécurité. Available at: https://oraprdnt.uqtr.quebec.ca/pls/public/couwu001?owa_sigle=CHM1012. (Accessed on 12 May 2010).

légaux de la protection d'une invention.

Université du Québec à Rimouski

*MOR-14694 – Ethical and professional practice*⁵²

To analyze the ethical questions raised in the practice of a profession. Identification of the main ethical issues related to the practice of some professions. Ethics and professional code of conduct. Microethics and macroethics. Historical landmarks in the evolution of deontology. New issues for professional conduct: development of new technologies and multidisciplinary endeavours. Analyzes the code of ethics of the forty professional orders in Québec. Discipline committee and ethics committee.

Analyser les questions éthiques soulevées dans l'exercice d'une profession. Identification des principaux enjeux éthiques reliés à l'exercice de quelques professions. Éthique et déontologie professionnelle. Microéthique et macroéthique. Jalons historiques de l'évolution de la déontologie. Nouveaux enjeux pour la déontologie professionnelle: développement des nouvelles technologies et pluridisciplinarité. Analyse des codes déontologiques des quarante corporations professionnelles du Québec. Comité de discipline et comité d'éthique.

Bishop's University

*ESG-366 Ethical Perspectives on Environmental Problems*⁵³

An introduction to the major philosophical traditions in the field of environmental ethics: natural law, utilitarianism, virtue theory and deontology. The use of case studies in environmental problems, e.g. ocean dumping, nuclear wastes, air pollution, greenhouse gases, etc., as a way of exploring several contemporary positions such as biocentrism, ecocentrism, the land ethic and deep ecology.

McGill University

*ARCH-674 Professional Practice*⁵⁴

The Professional Code, the Architect's Act and the architect's responsibilities to clients, colleagues and society, including professional ethics, responsibility in design, contractual arrangements, business conduct, construction supervision, issuing of certificates, construction and project management, concepts of architectural specification writing, building costs and life cycle costing.

⁵² Université du Québec à Rimouski (2010). MOR-14694 Éthique et pratique professionnelle. Available at: <http://www.uqar.ca/programmesFormation/Description/crs/MOR14694.htm>. (Accessed on 12 May 2010).

⁵³ Bishop's University (2010). ESG-366 Ethical Perspectives on Environmental Problems. Available at: <http://www.ubishops.ca/academic/pdf/esg.pdf>. (Accessed on 12 May 2010).

⁵⁴ McGill University (2010). ARCH-674 Professional Practice. Available at: <http://www.mcgill.ca/architecture/cacb/>. (Accessed on 12 May 2010).

APPENDIX H – Bylaws amendments for the professional associations

ACPA and ACPBC Bylaws

11.01 Amendments – All proposed additions to, amendments to, or rescissions of the By-Laws or Regulations must be approved by the Board before any further action is taken. Additions to, amendments to, or rescissions of the By-Laws or Regulations are not effective until they are approved by the voting members in good standing of the Association.^{55 56}

NSCS Bylaws

10.01 Amendments – Additions to, amendments to, or rescissions of the by-laws are not effective until they are approved by the members by special resolution as defined by the Act and filed and approved by the Registrar of Joint Stock Companies.⁵⁷

ACPO Act

6. – (1) The Council may pass by-laws regarding such matters as are necessary to conduct the business and carry out the objects of the Association and, without restricting the generality of the foregoing, the Council may pass by-laws...

(2) A by-law passed under subsection (1) and a repeal, amendment or re-enactment thereof, unless in the meantime confirmed at a general meeting of the members duly called for that purpose, is effective only until the next annual meeting of the members unless confirmed thereat and, in default of confirmation, ceases to have effect from that time, and in that case no new by-law of the same or like substance has any effect until confirmed at a general meeting of its members.⁵⁸

ACPO Bylaws

Article XVI – 1. Proposals to introduce new By-Laws, or to amend or replace existing By-Laws, shall be originated by the Council, or presented to the Council, signed by at least fifteen (15) members, and shall reach the Secretary not later than the 31st day of January of any year, if the same are to be considered at the next annual meeting of the Association.

2. The Council shall consider the proposals, and either lay the matter before the Association at the next annual meeting thereof or, if deemed advisable, take a letter ballot immediately. In the latter case, thirty (30) days shall elapse between the date the question is submitted to the members and the date when the ballot shall be closed.

3. A two-thirds majority of votes cast shall be necessary to introduce new By-Laws, to amend or repeal existing By-Laws.

4. No change in the By-Laws shall be voted on at an annual meeting unless a notice of thirty (30) days of such proposed change has been mailed to members.⁵⁹

⁵⁵ ACPA (2004). By-Laws relating generally to the transaction of the business and affairs of the ACPA. Available at: [http://www.pchem.ca/ACPA/EthicsBylaws/ACPA Bylaws.pdf](http://www.pchem.ca/ACPA/EthicsBylaws/ACPA%20Bylaws.pdf). (Accessed on 22 April 2010).

⁵⁶ ACPBC (2009). By-Laws relating generally to the transaction of the business and affairs of the ACPBC. Available at: <http://www.pchembc.ca/BylawsConstitution2009.pdf>. (Accessed on 22 April 2010).

⁵⁷ NSCS (2004). See Ref. 7.

⁵⁸ ACPO (1984). See Ref. 8.

⁵⁹ ACPO (1997). ACPO Bylaws. Available at: http://www.acpo.on.ca/ethics-and-by-laws/by_laws_e.php. (Accessed on 10 April 2010).

OCQ Bylaws

The Board of directors may adopt any regulation, as provided in the Professional Chemists Act, but it does not become effective until it has been passed by the legislature in Québec.⁶⁰

CSC Bylaws

Article VI, Section 4 – Voting Rights and Privileges of Membership

b), c) Full Members “MCIC”... and Associate Members “ACIC” shall have the right to... vote on amendments to the By-laws of the Society.

Article XX – Amendment of By-laws

(a) Proposals to enact new By-laws or to amend or repeal existing By-laws shall be presented to the Board, signed by at least fifteen (15) Full Members in good standing. The Board may itself propose the enactment of new By-laws or the amendment or repeal of existing By-laws. Following consideration by the Board, the Board shall seek confirmation or rejection of proposed amendments as follows in (b), (c) and (d) or directly as in (d).

(b) The proposed amendment and the Board's proposed action, i.e., acceptance, acceptance as amended, or rejection, will be published in the official Journal of the Society at least sixty (60) days prior to the Board's next meeting. Unless a petition rejecting the Board's proposed action, signed by not less than twenty-five (25) voting members, is received prior to the meeting, the Board may take the indicated action regarding the proposed amendment.

(c) If the Board's proposed action is rejected, i.e. a petition described in (b) is received, then the amendment shall be submitted to the voting members in the manner set out in (d).

(d) The Executive Director shall mail to each voting member a copy of the proposed amendment with a letter ballot, together with a copy of any recommendations the Board may wish to make.

All votes to be counted shall be referred to the Executive Director and be received before a date specified on the ballot. This date shall not be less than sixty (60) days or more than seventy (70) days after the date of mailing to the members.

The votes shall be counted by tellers appointed by the Board and the results announced to the Board at its next meeting.⁶¹

⁶⁰ OCQ (1964). See Ref. 9.

⁶¹ CIC (1998). The Chemical Institute of Canada By-Laws. Available at: http://www.chemistry.ca/index.php/ci_id/1765/la_id/1.htm. (Accessed on 12 May 2010).