

RACI Qualifications and Accreditation Committee

GUIDELINES FOR COURSE ACCREDITATION & QUESTIONNAIRE (June 2010 revision)

Introduction

This paper is in three sections.

Section 1 quotes information on course accreditation based on the Operations Manual.

Section 2 deals with current practices and interpretation of the guidelines.

Section 3 comprises the Questionnaire which is sent to university chemistry departments in preparation for accreditation/re-accreditation review visits.

Section 1

Information on accreditation based on the RACI Operations Manual (revised to incorporate proposed changes to Membership structure)

Accreditation of Courses:

The RACI has a system for accrediting chemistry courses as a pre-requisite for normal entry to the Chartered Chemist qualification. The system is designed to ensure that graduates of accredited courses have studied chemistry in sufficient breadth and depth to justify the award of CChem. The accreditation process reviews how much chemistry is included in degree courses. The RACI specifies in its accreditation guidelines the minimum chemistry content; the RACI Qualifications and Accreditation Committee also reviews the content of the chemistry units (subjects or topics) studied at each year level in order to ensure that the subject matter is studied sufficiently rigorously. All departments in tertiary institutions offering courses which could lead to a degree satisfying the requirements for Chartered Chemist and Corporate Membership of the RACI are encouraged to nominate such courses for accreditation (or re-accreditation) by the RACI. Graduates of courses granted accreditation will be eligible for the qualification of Chartered Chemist and Corporate Membership of the RACI (MRACI CChem), once they have obtained the required professional experience (currently three years after graduating), but are immediately eligible on graduation for non-Corporate Membership.

The accreditation procedure serves a useful purpose to ensure a measure of comparability between chemistry courses in Australia and should be valuable in improving areas where facilities are not adequate.

The Qualifications and Accreditation Committee of the RACI endeavours to review all accredited courses at not more than five year intervals, carrying out site visits at mutually convenient times.

All institutions offering courses for which accreditation is sought are required to provide details of the course contents in all years, including the degree structure at each year level and the content of each unit, as set out in the attached questionnaire. It is anticipated that much of the documentation required can be extracted from existing handbooks or similar publications (e.g. the institution's web-site).

Members of the Qualifications and Accreditation Committee will then visit the university to discuss and review the information provided and the facilities available to students including laboratories, computing facilities, lecture theatres, libraries, workshops. The Committee will expect to discuss detailed matters affecting the course, including problems within a cooperative framework. Opportunities for staff and students to meet members of the panel will be welcomed.

Following the site visit, the accreditation panel will produce a confidential report for the department involved, the Qualifications Committee and the Board of the RACI.

Departments accepting accreditation should inform the RACI as soon as possible of any changes in their courses, with details of the new/revised course.

It is not a prerequisite for academic staff to be Corporate Members of the RACI for accreditation of the courses they teach, but is strongly encouraged.

Course Requirements:

1. The course must include three years' systematic study of chemistry at a standard acceptable to the Board.
2. At first year level, not less than 25% of curriculum time* is devoted to the Principles of Chemistry**.
3. The course includes Mathematics or Physics studied for at least one year and to a standard acceptable to the Board.
4. At the second year level:
 - (a) Not less than 33% of curriculum time is devoted to the Principles of Chemistry, or
 - (b) Not less than 25% of curriculum time is devoted to the Principles of Chemistry, and not less than 25% of curriculum time is devoted to other chemistry based material.
5. At the third year level:
 - (a) Not less than 50% of curriculum time is devoted to the Principles of Chemistry, or
 - (b) Not less than 16% of curriculum time is devoted to the Principles of Chemistry, and not less than 50% of curriculum time is devoted to other chemistry based material.
6. A fourth year level (Honours) course devoted to Chemistry to the extent of not less than 66% of curriculum time is regarded as an adequate replacement for any deficiencies in fulfilling requirements 4 and 5.
7. Supervised practical laboratory work is a significant component at all levels of the course. This should involve both manipulative chemistry and chemical instrumentation normally to the combined extent of at least 50 hours at first year level, 100 hours at second year and 200 hours at third year.
8. At some stage during the course every student should receive formal instruction in Occupational Health and Safety, not only for their own protection but also because of their

future responsibility in whatever employment they undertake. Details should be provided. Given sufficient chemical context, this will be considered as chemistry-based material for purposes of accreditation.

*References to curriculum time refer to full time study and equivalent time is required for part time courses.

**Principles of Chemistry are defined as the area which comprises: stoichiometry, structure and characteristic properties of molecules, methods of structure determination, properties of matter in relation to structure, chemical thermodynamics, reaction processes, reactions of metal and non-metal compounds including carbon compounds and experimental methods for the investigation of these matters.

Tertiary Institutions Information Check List for Qualifications Committee Assessment:

The following information is required:

1. Complete list of academic staff names and qualifications;
2. List of support staff names, qualifications and functions;
3. Course details, discussion of compliance with RACI requirements
4. Teaching facilities;
5. Description of laboratories, equipment, library;
6. Teaching loads;
7. General description of research activities;
8. Proposed course changes;
9. Statements about particular problems;
10. Financial constraints;
11. Syllabuses of theoretical and practical work;
12. Areas of interest to the RACI, for example, enrolment numbers, remedial teaching;
13. Any other matters.

Accredited courses:

The full list of accredited courses is available from the RACI website at:

<http://www.raci.org.au/education/university-course-guide>

Note that some degree courses are marked with an asterisk (*) indicating that certain combination of subjects are required to meet the accreditation guidelines.

Section 2

Current practices of the Qualifications and Accreditation Committee and Interpretation of Accreditation Guidelines

The Committee reports to the Board of the RACI and makes recommendations regarding accreditation to the Board. The Board makes decisions on the recommendations of the Committee (to ratify recommendations regarding accreditation, or otherwise, etc.)

The Committee comprises representatives from most States, with varying backgrounds. Current membership (May 2010) is as follows:

Name	State	Background/experience
Richard Thwaites (Chair)	Victoria	Industry
Paul Mulvaney	Victoria	Academic
Paul Bernhardt	Queensland	Academic
Roger Read	NSW	Academic
Des Williams	South Australia	Academic
Peter McCafferty	Western Australia	Government Laboratory
Michael Gardiner	Tasmania	Academic

The Committee meets approximately five times a year via telephone hook-up.

The role of the Committee is to establish accreditation guidelines, interpret the guidelines when accreditation queries arise from universities, and assess courses to determine whether they meet accreditation standards for RACI Corporate Membership/Chartered Chemist. The Committee does not assess individual students or graduates of these courses.

Whilst the prime focus of the Committee is to provide guidelines for Chartered Chemist and Membership of the Institute, accreditation positively encourages universities to maintain standards, particularly in the area of practical laboratory work. Chemistry departments are frequently under pressure to reduce costs, and the threat of having RACI accreditation removed if their courses do not maintain an adequate practical content can help to relieve some of this pressure and maintain funding. Accreditation by the RACI is also beneficial to university chemistry departments in helping to attract students. RACI accreditation is a professional standard benchmark which can be used to encourage students to enrol.

The proposed new Higher Education Graduation Statement, to be given to graduates in addition to their graduation certificates and academic transcripts, has provision for comments regarding whether the degree that the particular student has taken is accredited by a professional body. The Graduation Statement is expected to be especially valuable to graduates who are seeking employment, particularly overseas. Accreditation of courses by the RACI could well become more sought after by institutions when this Statement is introduced as the value of accreditation to students internationally is enhanced.

The Qualifications Committee is working on a 5-year cycle of implementing accreditation visits:

Year	State(s)
2004	Victoria
2005	NSW and ACT
2006	Queensland
2007	Western Australia
2008	Tasmania, South Australia, Northern Territory
2009	Victoria
2010	Victoria, NSW and ACT
2011	Queensland
2012	Western Australia

Prior to each visit, a Questionnaire (see Section 3) is sent to the department concerned, covering the points outlined in the Check List taken from the Operations Manual (see Section 1).

Normally two or three members of the Committee carry out accreditation visits, at least one of whom is from the State concerned, the other is another member of the Committee (usually the Chair).

Of the 40 or so Universities in Australia, most (around 29) offer RACI accredited courses.

Some multi-campus institutions offer the same course at different campuses, some offer different courses at different campuses (e.g. Monash – Clayton, Gippsland and Parkville (Pharmacy)) and some only offer accredited courses at, say, one of their campuses. In some universities, first year chemistry may be offered at several locations, but advanced level chemistry is only offered at one campus. The Qualifications Committee tries to ensure that correct information is provided on the RACI website regarding accredited courses to enable Branch Committees to assess the qualifications of candidates seeking Chartered Chemist status and Corporate Membership of the RACI.

The Committee continues to pay particular attention to the issue of laboratory hours, which have tended to show a decline in recent years. Some university courses have not received accreditation because of insufficient practical content. The guidelines indicate a total of not less than 350 hours supervised laboratory work over 3 years. The Committee believes this should be achievable if the chemistry content guidelines are met. In overall terms, an accredited degree normally requires a minimum of 9 semester units of chemistry (2 at first year, 3 at second and 4 at third). Assuming each unit contains a practical content equivalent to, say, 3 to 5 hours a week on average over 10 to 12 weeks a semester, this target should be achievable. The Committee would expect practical classes at second and third years to be longer (4 to 6 hours per session), thus helping to achieve the guidelines of 100 hours in second year and 200 hours in third year, but notes that in practice, in many universities, practical sessions do not start until second or third week, and often terminate before the end of the semester. The Committee recognises the difficulties faced by universities, particularly at first year, when chemistry laboratories have to be offered to all science students, but is unwilling to reduce the required number of hours in the guidelines in view of the experimental nature of the scientific discipline of chemistry. It notes that industrial employers of graduate chemists frequently expect their new recruits to be proficient in laboratory skills: reducing laboratory hours may hamper the employability of new graduates.

It should be noted that chemistry degree courses accredited by the Royal Society of Chemistry in the UK (normally of at least 4 years' duration) contain at least 400 hours of supervised practical work, exclusive of any project, and chemistry degree programs recognised by the American Chemical Society contain 400 hours of laboratory work after first year.

The question of mathematics and/or physics has often been raised. The guidelines specify a year of mathematics or physics, which could be interpreted somewhat ambiguously. The Committee's preferred interpretation is that accredited degrees should have at least one year of mathematics or one year of physics. This guideline would normally be satisfied by students taking two semester units of maths or physics in first year. The preference of the Committee is for students to take mathematics in order to ensure that students enrolled in accredited courses are given a sufficient

mathematical background to enable the quantitative aspects of chemistry at more advanced levels to be understood and mastered.

The main focus of the RACI is to accredit chemistry and chemistry related courses. A number of pharmacy, pharmaceutical science, medicinal chemistry and chemical engineering courses are accredited, as are several double degree courses which contain chemistry, and the Qualifications Committee is happy to review other chemistry related courses to see if they meet the RACI's accreditation guidelines. Some institutions offer a proliferation of degrees and combinations of subjects within each degree. This can make it problematic for the Qualifications and Accreditation Committee. In some cases, degrees (those which are starred in the Operations Manual) meet the accreditation guidelines only if certain combinations of subjects are taken, necessitating Branch Committees to refer to academic transcripts.

Regarding the timing of granting accreditation, in earlier years it was the custom not to grant accreditation to courses until the first cohort of students had completed third year. (In other words, students would enrol in a course which might or might not be accredited by the RACI.) This was felt to be unsatisfactory, and not really fair to university departments or students. Courses are now granted accreditation provided that there is sufficient evidence at the outset to demonstrate that they will meet the RACI guidelines at all year levels. In practice, this can mean provisional accreditation where details of second and third years are not completely finalized.

The Qualifications and Accreditation Committee recently conducted a survey to ascertain information on the range of Occupational Health & Safety topics being taught in accredited courses, in how much detail these topics are studied, and at what level. The results of the survey were made available in 2009: some aspects could be used to develop further guidelines in the future.

Section 3

Text of Questionnaire used in accreditation/reaccreditation visits (normally provided to university chemistry departments in advance):
(see next page)

RACI Qualifications Committee
ACCREDITATION OF COURSES (2009/2010 Revision)

INSTITUTION:.....

COURSE(S):.....

UNIVERSITY REPRESENTATIVE(S):.....

Reviewer(s):.....

Date:.....

Size of faculty and qualifications, research interests and experience of staff members:

Tenured staff:

Other teaching staff:

Teaching loads:

Support staff:

Number of students at each year level:

Student/staff ratios:

Laboratory facilities and practical laboratory program:

Bench Space and Layout:

Equipment available to undergraduates

Safety equipment and facilities:

Types of experiment performed at each year level (including details of typical experiments):

Laboratory facilities and practical laboratory program (cont):

Undergraduate laboratory hours:

- Level 1
-
- Level 2
-
- Level 3
-
- Level 4 (where relevant)

Library facilities:

Size, number of volumes, range of titles, study spaces

Lecture theatre facilities:

Computer facilities:

Teaching course material and recommended texts:

Note: Include information on course outlines, teaching methods (lectures, tutorials, practical work, quizzes, tests, etc) expected learning outcomes, etc and include information on text books used:

- Level 1
- Level 2
- Level 3
- Level 4 (where relevant)

Sample Examination Questions: at each year level:

Examination philosophies: (multiple choice, problem solving, short explanations to ensure students have grasped essential principles, essays, etc.)

Minimum academic entry requirement for student entry (and trends):

Achievement of accreditation guidelines:

Chemistry content of degree program at each year level:

- Level 1
- Level 2
- Level 3
- Level 4 (where relevant)

Mathematics or Physics:

Other compulsory subjects required for chemistry major and options/electives available:

- Level 1
- Level 2
- Level 3
- Level 4 (where relevant)

Occupational Health and Safety:

Formal instruction in use of laboratory equipment:

Instruction in handling potentially hazardous materials in the laboratory:

Interpretation of MSDSs:

Hazard Analysis in the workplace:

Other:

Total estimated hours spent on OH&S issues during undergraduate course:

Course outcomes:

Employment of students after graduating and demand for graduates:

Demand for graduates:

How is the RACI promoted to students:

Any other issues:

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