DISCIPLINE PROFILE – Chemistry and Biomolecular Sciences (CBMS)

1. Nature of the discipline

Chemistry and Biomolecular Sciences are disciplines that are central to modern science and technology. The structure of the Department reflects the fact that 1) chemistry is a core discipline in the sciences generally and underpins modern biology specifically and 2) that the biomolecular sciences is at the interface of chemistry with biology and will be a major driver of biology in the 21st century. At Macquarie University, staff of the Department of Chemistry and BioMolecular Sciences (CBMS) undertake research into a wide range of areas spanning chemistry and biomolecular sciences. One of the Department's strengths is the ready ability to form non-traditional linkages that will facilitate innovation in the post genomics era. As a result, teaching and research in CBMS at Macquarie University does not necessarily follow the more traditional patterns of academics units elsewhere. Indeed the Department's mix of expertise is relatively novel, spanning as it does both traditional disciplines in chemistry as well as those on the interface of chemistry with biology. These latter disciplines include, biochemistry, bioinformatics, medicinal chemistry, chemical biology, systems biology, structural biology, molecular biology, cell biology, biotechnology, genomics and proteomics. Owing to this, the Department needs to accommodate major differences in research output, teaching methodology and professional experience of academic staff in different topical areas. CBMS therefore operates in an integrated fashion and seeks to breakdown the discipline barriers more typical elsewhere. There is a common goal in CBMS to attain excellence in teaching, produce high-quality research outcomes and uphold a strong commitment to professional and community service.

2. Qualifications.

Associate lecturers should have at least a good Honours degree. Academic staff at the level of lecturer or above must hold a PhD.

3. Teaching contributions.

All academic staff in CBMS are expected to be effective and conscientious teachers and to have a significant commitment to teaching, with some level of undergraduate teaching.
Teaching responsibilities in CBMS typically comprise lecturing, tutoring, laboratory demonstrating, unit organisation, curriculum development. Staff are expected to continuously update units to take account of factors such as advances in knowledge and relevance to student and employer needs. For Level B to E staff, supervision of honours/postgraduate research students is also expected. The balance between these teaching responsibilities will vary between staff members, however those at Levels B to E will generally assume principal responsibility for the administration and coordination of at least one unit and make a major contribution to the teaching of at least one other unit.

Teaching workloads are assigned by the Head of Department or nominee, with equitable distribution across all staff after taking into account their relative responsibilities in other academic areas, such as research and committee involvement. Staff in CBMS can be expected to teach at any time of the year. With distance education offerings and the internationalisation of the curriculum, this can include, January/February, within and between semester breaks and December. However the Head will work to achieve an outcome where all staff have reasonable

periods of contiguous time to pursue other academic pursuits. Workloads are assigned annually after input from academic staff. New staff members are almost always given a fractional workload that would normally be 25 – 50% that of an average staff member for a period of 1 – 3 years.

CBMS offers postgraduate qualifications in the form of Masters of Biotechnology and PhD and and MPhil degrees by research, as well as Honours degrees. All academic staff above Level A are expected to offer research projects. A typical combined Honours/postgraduate research load would be in the range of 2 – 4 students at any one time, with the staff acting as the primary supervisor. Staff simultaneously would typically act as associate supervisor for other students as prescribed by current polices of best supervisory practice. Successful supervision of an above average number of research students may be one positive indicator of academic success.

3.1 Associate Lecturer (Level A Academic)
Level A staff may contribute to all levels of undergraduate teaching with particular emphasis on laboratory demonstrating and tutoring, usually in close collaboration with unit coordinators. Appropriately qualified Level A staff may also be called on to deliver lectures and be involved with examination and other forms of assessment. A PhD is considered to be an advantage but is not a requirement in lecturing and curriculum development. Associate Lecturers are not expected to act as sole coordinator of the unit of study, unless they are particularly experienced or well qualified to do so and then only if they are at point 6 or above on the Level A salary scale.

Associate Lecturers should be given opportunities to develop their career both academically and professionally. They are also encouraged to make a contribution to collegial discussions.

3.2 Lecturer (Level B Academic)
Level B staff should make a substantive contribution to all aspects of teaching including lecturing at all levels, unit coordination and revision/preparation of teaching materials. They are encouraged to supervise research students (Honours and postgraduate) as both main and associate supervisor with whom they share research interests and /or facilities.

For appointment at Level B, teaching experience as above is desirable but is not an exclusive requirement. An appointee at Level B will usually be expected to have a relevant research based expertise in line with the teaching mission of the Department. Alternatively, a high level of attainment in university level teaching, as demonstrated by appropriate performance indicators, and associated professional activities might also be considered grounds for appointment or promotion to Level B.

3.3 Senior Lecturer (Level C Academic)
In addition to the teaching duties outlined for Level B, Level C staff should have a broader view and more extensive experience of the needs of their particular teaching areas. For promotion to this level a lecturer is expected to have demonstrated competence in organising and presenting a range of undergraduate units and in assessing and advising students, and to have taken on responsibilities consistent with those of established senior academic staff. In assessing teaching, contributions to curriculum development such as designing new units or unit material, experiments or of devising computer based teaching, if applicable, should be taken into account.

3.4 Associate Professor (Level D Academic).
Level D academics are expected to have a demonstrated interest in and commitment to teaching at all levels from first year to postgraduate. They should have demonstrated mastery of their subject areas. They should also have developed substantial teaching materials, revised existing units and/or introduced new units, and played an active role in developing programs of study. A track record of attracting and capably supervising research students should also be evident.

3.5 Professor (Level E Academic).
In addition to the qualities required of an Associate Professor in the area of teaching, Level E staff should also demonstrate leadership and vision in curriculum development and reform. Peer recognition of teaching accomplishment and oversight of major teaching programs is expected at this level.

4. Scholarship and Research
All academic staff at Level B to E are expected to be active in scholarship and research relevant to chemistry and/or biomolecular sciences. Outcomes are most commonly published as papers in international refereed journals with wide circulation. Papers reporting the results of original research would normally appear in journals of specialist discipline readership. Contributions to Chapters of specialist books are also considered an important indicator of scholarship. Publication of review articles targeting a wider audience in a recognised review journal or in monographs would usually be evidence of the high professional standing of the author. Likewise, publishing of scholarly books is rare but a sign of particular distinction when it occurs. Presentation of papers to specialist conferences and research seminars at other institutions is expected. Invited presentations to specialist meetings, especially with an international reach, are considered examples of high standing in the discipline.

Length of papers can vary considerably and are not key indicators in the discipline. Objective indicators of quality however are considered to be important. Such indicators include the impact factor of the journal, ranking of the journal within the discipline and citation numbers for the particular output. This last value is a lagging indicator however and is only relatively important for established researchers. Publication rates will vary and expectations will increase as seniority rises. In general however a scholarly output is only considered significant if it has been subject to peer review.

Joint publication is the norm in chemistry and biomolecular sciences and sole authorship is highly unusual. The multidisciplinary nature of some studies may justify six or more authors. The senior author is the one that initiates and directs the research and who takes prime responsibility for the publication. A student's research will almost always be published with at least the main supervisor. Generally, senior authorship is recognised by that author appearing as either the first name or the last on a publication. Other combinations are reasonable however. For example, where two senior research leaders make equal contributions to an output, one of the two may appear as the penultimate author. For large multidisciplinary teams a senior researcher may, on average, expect to appear as the senior author on about half (or more) of their outputs. Where appropriate, granted Patents are also a mark of research productivity.

Other important indicators of research standing would be appointments to professional societies in some senior or leadership capacity, editorships of books, editorship of journals and regular requests to review of manuscripts for quality journals and review of grants by granting agencies.

4.1 Associate Lecturer (Level A)

Whether or not enrolled in a PhD, Associate Lecturers are encouraged to devote part of their time to scholarship and research. The time available for this varies but would be generally be less than other levels since there is an expectation that Level A staff are likely to have a relatively high teaching load. Level A staff are unlikely to be in a position to run their research independently and probably would not have external research funding. They are however encouraged to apply with more senior staff at this or other institutions. Level A academics are unlikely to be primary research supervisors but may be Associate supervisors. Level A staff are unlikely to publish regularly but may appear as minor authors from time to time as part of collaborative research.

4.2 Lecturer (Level B)

Level B staff are expected to have at least one clearly defined area of scholarship and research funded from internal or external sources. Lecturers should have demonstrated a capacity to initiate, develop and complete independent research with a record of attainment such as publications in international journals. An average rate of at least one major refereed publication per year would be typical. Evidence of successful supervision of at least honours research students is useful for promotion to this level but not essential.

4.3 Senior Lecturer (Level C)

Level C staff should be beginning to develop an international reputation for their scholarship and research, as is most readily judged by papers in high ranking journals in the field and/or invitations to present results at significant research conferences. Their level of research funding should normally suffice to support research students and/or other research staff. An average productivity rate of 2 major refereed publications per year would be typical with some of these as a senior author. A career total of at least 15 refereed papers in international journals would be anticipated for promotion to senior lecturer.

4.4 Associate Professors (Level D)

Associate Professors are expected to have made substantial contributions to scholarship and research and to have an established national, if not international, reputation. A history of consistent research funding and research supervision is expected. A Level D would also be expected to regularly attract competitive external research funding. Staff at this level would be the main supervisor for two or more research students most of the time. Level D staff would be averaging about 3 refereed publications per year with about half as senior author. Quality of publications should also be taken into account however and Level D staff should be able to demonstrate their work is recognised by, for example, high citation rates and *h*-index relative to discipline norms over time. Level D staff might also be expected to be appointed to editorial boards of journals as an indicator of an outstanding international reputation and to be regular journal and grant assessors. Most Associate Professors regularly receive invitations to speak at professional meetings and scientific conferences. A career total of 20 – 50 refereed publications would typically justify promotion to this level.

4.5 Professor (Level E)
Professors should have gained an international reputation for scholarship and research, as evidenced, typically, by such factors as the following: consistent and substantial research funding; a productive research group; consistent invitations to address professional meetings and or scientific conferences with an emphasis towards high profile invitations such as to address plenary sessions; invitations to write reviews; membership to editorial boards. Promotion to Level E would normally require in excess of 50 refereed research publications. Professors would be publishing at a high rate although the quality of publications carries more weight. Authorship should indicate a senior role in the conceptual development of the research. Representatives within the individual's publications would need to demonstrate evidence of outstanding quality by, for example, being in the very high impact multidisciplinary journals, and/or be in the top 10% of specialist journals as measured by impact factor or the journals ranking in the field and/or having had impact in the discipline as measured by citation numbers and *h*-index. Overall, professors should be able to show clear evidence of leadership and innovation in their research area/s. A career total of > 50 refereed publications would typically justify promotion to this level.

5. Contributions to the University and Community.
CBMS staff are expected to share in administrative duties and committee work within the Department, the Division and the University as a whole. Committee members are more likely to be selected based on expertise in the area rather than seniority. Staff members at all levels should contribute to promoting the interests of the discipline and University as a whole.

There is a growing trend towards consultancies and commissions (contract research) and this is encouraged as chemistry and biomolecular sciences are central for many innovative commercial technologies. These however should not impact on teaching and other responsibilities. Such work may produce publications, but issues of confidentiality and IP may impact on this.

Many academics participate in activities of relevant professional institutions and learned societies and often take on leadership roles. They may also be involved in such related activities as conference organisation.

The Department encourages staff to be involved with arrangements for the HSC through organisation and presentation of lectures, membership of syllabus or examination committees, marking, preparation of text books or study guides and school visits.

5.1 Associate Lecturer (Level A)
University service is largely confined to the Department and involves student advising, enrolment and other aspects of unit administration. Level A staff are encouraged to take an active role in Department meetings and promotional activities.

5.2 Lecturer (Level B)
Level B academics generally take an active role in student advising, enrolment procedures and promotional activities. They may also serve on Department, Divisional and/or University committees.

5.3 Senior Lecturer (Level C)
Senior Lecturers should provide service to the University by serving on Department, Divisional and/or University committees and may be asked to convene Department committees and working parties. Other professional activities might include work for professional organisations, workshops and conferences or special interest groups such as HSC committees.

5.4 Associate Professors (Level D)
Associate Professors typically cover a range of University and community activities similar to Level C staff. They might be expected to Chair such groups or to represent the Department or Division on a University committee. Professional activities often include office bearing in professional societies, membership of editorial boards and major responsibility for administration of Department affairs, including, potentially serving as Department Head.

5.5 Professor (Level E)
A Professor is expected to take on a wide range of Departmental Divisional and University administration, typically in leadership roles. Professorial staff should be active in forging and promoting links within the University and between the University, industry and the community. They should play an active role in mentoring junior staff and assist the University in preparing strategic material and documents for such things as quality audits. Professors should be prepared to serve at least one term as Department Head. Professors are likely to be elected to Fellowship of learned societies, in recognition of major academic and /or professional accomplishments.