

DEPARTMENT OF CHEMISTRY
College of Letters and Science
University of Wisconsin-Madison

PLAN FOR ASSESSMENT

OF THE

GRADUATE PROGRAM

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Introduction

The Department has set its first goal as assessment of the Graduate Program in Chemistry. We are focussing on this area because of having already recognized the need to assess the scholarly efforts and future directions of our Department. Assessment of the Graduate Program is essential to a serious consideration of our scholarship since the two are closely intertwined. Our Long Range Planning Committee has just completed a draft report to the Department on its scholarship and its reflection in the recent National Research Council assessment of the quality of graduate programs. Our program was again rated as being among the top ten, corresponding to the top 7%, but we are eager to improve and secure that standing. The Long Range Planning Committee has worked to identify crucial issues and make proposals to the Department. This document will be a useful part of our internal assessment and point to some of the questions that we want the full assessment to address.

A complication to developing an assessment for the undergraduate major presently is the presence of substantial undergraduate curriculum reform efforts in our Department, one of which is part of a carefully constructed project funded by the National Science Foundation. This continuing effort has produced and is producing a great deal of assessment information on its own. Further probing of that activity does not seem particularly productive now. We expect the assessment of our undergraduate program to include much of what we learn from our curriculum studies. We plan to consider and prepare an assessment plan for our undergraduate major during the coming year.

Educational Goals and Objectives

The goal of our Graduate Program in Chemistry is to prepare individuals to function as professional chemists by guiding them to a mastery of a portion of our very broad discipline at a level where they are able to create new knowledge. The detailed implementation of these goals is complicated by at least two factors: the *diversity* within the discipline and the *range of professional goals* of our students. The *diversity* of the field has always been large and has grown tremendously in the last few decades. The science in our graduate program, all fitting into the discipline of

Chemistry, ranges from studies of small molecules found in interstellar space to the details how signaling occurs in living cells. In between, we find studies of the human genome, molecules striking the surfaces of liquids, the nature of silicon surfaces used in semiconductor devices, the interaction of light with matter, the properties of catalysts, the motions of polymers, both biological and synthetic, and many other topics. The *range of goals* is not as difficult to describe but is large. In general, our students aspire to positions as faculty in research universities, as faculty in primarily undergraduate institutions, or as researchers in industry and government laboratories.

The last category is particularly important, as most of our Ph.D. graduates take positions in industry. We have strong historical and current connections to industries employing chemists. Indeed talk of the changing role of the Ph.D. chemist in industry is a strong motivator for a careful assessment of our graduate training.

The means of accomplishing our objective are embedded in the requirements and patterns of earning a Ph.D. degree in Chemistry. They are

- Course work in a subdiscipline of Chemistry along with course work in supporting areas, such as, for example, biology or physics.
- Completion of admission to candidacy examinations that serve to consolidate course work and awareness of new developments. An important component of the admission to candidacy is completion of an *original research proposal* outside the immediate area in which the candidate is conducting research.
- Completion of original research almost invariably concluding with a set of contributions to the scientific literature.
- Preparation and defense of the Ph.D. thesis.

The primary goal of our assessment work is to discover (1) how effectively we prepare our graduates for their subsequent careers, (2) how our approaches to graduate training affect the perception of the scholarship of our Department, and (3) how well we are participating in new intellectual opportunities in chemistry and related fields.

Methods of Assessment

The Department constantly engages in implicit and explicit assessment. We constantly ask ourselves two questions: are our graduates able to function as professional chemists and scholars and are they competing successfully for first-rate positions in industry and academia? Much of our assessment is designed to answer those questions from the point of view of potential employers, of recent graduates, of graduates who are established in their careers, and of the faculty. We hope to obtain

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information from all of these sources, primarily by asking them what they think. In addition, we have available or can obtain quantitative data about positions of our graduates. We intend to obtain the following information.

- Rankings of our graduate program, employment rates of our graduates, types of employment of our graduates, length of time to degree, and other related numerical information about both the students and the Department.
- Comments on the program from students in the program. (We must have help in constructing an appropriate questionnaire and conducting suitable interviews. We have a group, the Graduate Student - Faculty Liaison Committee, in place to help us identify the issues to probe.) We are eager for advice from the College about obtaining assistance in constructing questionnaires.
- Comments on the program from individuals completing the program in the last five years who are in industry and academia. Constructing the questionnaire is the crucial issue here. We hope to involve an external expert and the Long Range Planning Committee.
- Comments on the program from individuals completing the program more than five years ago. Constructing the questionnaire is the crucial issue here. We hope to involve an external expert and the Long Range Planning Committee.
- Comments on the program from potential industrial employers of our graduates. Constructing the questionnaire is the crucial issue here. We hope to involve an external expert and the Long Range Planning Committee. We expect to contact those companies with whom we have long standing contacts and who often interview in our Department. Because we have an on going relationship, they are likely to be the most forthcoming even if they have not hired our graduates recently. Because the companies that interview on campus tend to be large established ones, we will also use contacts through our graduates to obtain information from smaller companies.
- Comments about our graduates from undergraduate teaching institutions. Constructing the questionnaire is the crucial issue here. We hope to involve an external expert and the Long Range Planning Committee. These may be the hardest data to obtain, but we expect to use contacts through our graduates and through individuals the faculty know at such institutions.

We intend to use these data to identify the most important features of our graduate training and identify the aspects we do well and those we must improve. We hope that the assessment will allow us to proceed in the development of our training, scholarship, and hiring with an eye toward being one of the major players in training graduate chemists and creating new chemical knowledge.

Timetable for Implementation

We intend to begin constructing our measurement instruments during the Fall of 1997. If that process goes well, we will seek responses during the Spring and plan on having the material in hand for an assessment report late in the semester. Depending on the time and cost of constructing reasonable instruments and obtaining responses, we may be overly optimistic.