

Teaching Associate and *Certificate in University Teaching Programs*

Department of Chemistry
Syracuse University

Program Prospectus

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I. Introduction.

The vision of Syracuse University as the student-centered research university focuses primary attention on learning at all stages of professional development. In the past, doctoral graduate education in the sciences has been solely concerned with the creation of new knowledge, most commonly called research. Scholarship, however, has recently been more broadly defined to include not only the type of scholarship associated with creation of new knowledge (research), but also to encompass the application of knowledge, the integration of knowledge, and the dissemination of knowledge (often called "teaching"). Graduate studies under this expanded definition may, therefore, be conceived in terms of all of these important activities.

Research activities of doctoral students in chemistry are of vital importance to the development of new generations of chemists. Recently, however, the Association of Graduate Schools in the American Association of Universities has recognized a more broadly defined graduate training model in a statement saying that "...virtually all doctoral students, whether or not they enter the academic sector, will be engaged in not only the creation but the dissemination of knowledge, [and] the skills acquired in learning how to teach will be fundamental to their future work". Teaching involvements for graduate students in chemistry have been historically viewed by both graduate students and their faculty preceptors as necessary, but principally unwanted, side activities which compete for the time and attention of the students to the detriment of their professional development. This attitude is most frequently carried with our students, after their Ph.D. studies have concluded, to their employment, either in the academic or industrial realms. This pervasive attitude has led to the conception of research and teaching at universities as disparate faculty activities which compete for graduate student and faculty time. A more appropriate model views undergraduate education, graduate education, and faculty scholarship as unified by the theme of learning. Ph.D. chemists in most professional employment settings must frequently engage, in some way and to some degree, in the dissemination of knowledge (teaching) related to their work. This "teaching" may take the form of presentations of research, reports of development progress, instructing coworkers in specific technical areas or numerous other activities.

Syracuse University is addressing the issues of training the future professoriate in teaching proficiency through the implementation of an overall *Future Professoriate Program*. It is through this program that an effective and meaningful approach to the more broadly conceived training of Ph.D. students in the dissemination of knowledge may be accomplished. For this reason, the Chemistry Department is pleased to participate in the *Future Professoriate Program*, as outlined in this document. Besides enhancing the overall professional preparedness of our doctoral students, the program in the Chemistry Department is also expected to serve as a vehicle for the overall improvement of instruction in the department, both at the graduate and undergraduate levels.

A principal problem facing any modification of the *status quo* in our Ph.D. program in dealing with these teaching issues is how to reconcile the apparently competing teaching and research activities of graduate students and provide a more broadly based graduate experience which includes increased teaching experience without increasing time to degree and decreasing student scientific productivity. We believe that in chemistry this can be accomplished by helping our Ph.D. students become better and more efficient teachers. The improved quality of instruction and enhanced efficiency of graduate teaching assistants may, in fact, improve their scientific productivity by eliminating many of the inefficient teaching practices frequently observed in unskilled teachers. In addition, their communicative skills will also undoubtedly be greatly improved. This approach creates a "win-win" environment for both the teachers and their students.

II. **Background.**

The Department of Chemistry currently has 20 tenured and tenure-track faculty members, and over 20 postdoctoral associates. In addition the department has several research associate and assistant professors. The graduate population of the department is approximately 65 full-time graduate students. The incoming graduate classes have averaged ten to fifteen students for several years. The departmental support staff includes well-staffed electronics, glass, and machine shops, as well as stockroom and secretarial services.

The department offers three programs leading to the M.S. and Ph.D. degrees, in four areas of chemistry; analytical, inorganic, organic and physical chemistry. Essentially all graduate students in the doctoral program in chemistry receive financial support in the form of either teaching or research assistantships.

Teaching is integrated into our graduate program. Teaching assistants supervise laboratory and recitation classes in Freshman Chemistry, Organic Chemistry, Physical Chemistry and several other courses. Class contact, preparation, and grading activities typically total twelve to sixteen hours per week. A teaching assistant with little or no previous teaching

experience is typically assigned to supervising a laboratory section of either General Chemistry (CHE 107/117) or Organic Chemistry (CHE 276/286). These teaching assistants are typically given relatively little autonomy and responsibility for the overall progress of the course. It is most common that chemistry doctoral students spend their first two years on teaching assistant appointments and their latter years on research assistant appointments. Thus, in order to be most effective in enhancing the instructional needs of the department and to provide the students with the greatest opportunity for participation, the *Future Professoriate Program* in chemistry must operate, to as great a degree as possible, in the first two years of a students program of study.

The current departmental teaching assistant training program for incoming students is linked closely to the University-wide Teaching Assistant Program and orientation. New students, after participating in the University-wide TA orientation, report to the chemistry department to take divisional breadth examinations and meet with academic advisors. Teaching assistants for specific classes meet typically very early in the semester with the course supervisor regarding course policies and practices.

III. **Program Components**

We propose to enhance the teaching abilities of our graduate students by providing them with the option to participate in the department's *Future Professoriate Program*. This program will contain several components designed to address both general and specific chemistry departmental issues relative to teaching enhancement including; (1) promotion from a Teaching Assistant (Ta) to a Teaching Associate (TA) appointment, (2) participation in a "significant, mentored, independent teaching experience", and (3) development of a Professional Portfolio which includes, besides the more typical research-based information, detailed information regarding specific aspects of the students teaching development. Successful participation in the program is expected to culminate in the awarding of the *Certificate in University Teaching*.

A two year model is proposed for the chemistry department, during which time a student should be able to complete essentially all the requirements outlined below (except the final components of the Professional Portfolio). During the first year, it is anticipated that the student will be assigned, as a teaching assistant (Ta), to supervise either laboratory and recitation classes in Freshman Chemistry, Organic Chemistry, or Physical Chemistry. At some point in their first two years, usually during the second year, these students should participate in at least two semesters of CHE 799 (General Chemistry Seminar, total 2 credits min.) and take SCI 544 (Teaching College Science, total 2 credits). A graduate student with a strong record of teaching at this level would then either apply or be invited to receive the rank of Teaching Associate (TA). The rank of Teaching Associate will involve significantly greater pedagogical

responsibilities for teaching a course than normally assigned to teaching assistants. A Teaching Associate may then serve as a head TA of a course for one semester, gaining experience in curricular design and development and in guiding less experienced graduate assistants. Typically, a Teaching Associate assigned as head TA to a laboratory course will also lead weekly sessions (when the laboratory is operating) for all teaching assistants involved with the course during which peer critiques and teaching practices will be discussed. During this time, as appropriate, the TA may also be involved in planning the "significant, mentored, independent teaching experience". There would also be regular meetings with the teaching mentor to discuss enhancing teaching activities. The independent experience would typically involve teaching either a special topics class/module, an advanced laboratory or selected portions of regular departmental lecture offerings. A critical aspect of this last stage is the development of a close faculty-student mentoring relationship in which the TA and the faculty mentor meet on a regular basis to review aspects of the student's professional teaching development including video taped teaching sessions and written course materials (exams, handouts, syllabi, etc...). These experiences and developed materials will then allow the student to complete the teaching portion of the professional portfolio leading to the awarding of the *Certificate in University Teaching*.

In CHE 799, all teaching associates and faculty mentors will be expected to meet as a group at least twice to discuss various aspects of improved teaching abilities and strategies. Also, all students will be expected to develop written statements relating to their personal "Philosophy of Teaching" and critiques of their teaching development. Participants in the class will help each other deal with the problems encountered in their teaching experiences and develop more effective teaching practices.

IV. **Program Requirements and Operation.**

Graduate students in the chemistry department will have the option to participate fully in the *Future Professoriate Program* in chemistry, leading to the awarding of a *Certificate in University Teaching* in conjunction with the Ph.D. degree. The *Certificate* recognizes the completion of a formal program of professional development designed to provide the requisite skills, knowledge, and experiences that will increasingly be expected of new Ph.D.'s seeking college or university faculty positions. The *Certificate* also recognizes the close interaction between the graduate student and the Teaching Mentor throughout the teaching associateship. The *Future Professoriate Program* has many components aimed at preparing new Ph.D.'s for academic positions including a series of teaching seminars (presented both by the Graduate School and the science departments) designed to assist faculty in preparing graduate students for college teaching careers. Additionally, the development of a Professional Portfolio documenting the graduate student's professional accomplishments, including teaching, is part of the *Certificate*

requirements. Increasingly, senior doctoral students are asked to provide evidence of their teaching experience and development as they pursue assistant professorships. The Professional Portfolio is an ideal means of representing such experience and competence.

Certificate in University Teaching. The Department of Chemistry will recommend to the Graduate School that a student be awarded a *Certificate in University Teaching* upon successful completion of the following requirements:

- Being a graduate student in "good standing" in the degree program of the department.
- At least two semesters teaching experience with the rank of Teaching Assistant and two semesters teaching experience with the rank of Teaching Associate.
- Satisfactory completion of at least two semesters of CHE 799 (General Chemistry Seminar, total 2 credits min.) with a grade of B+ or higher.
- Take 1 semester of SCI 544 (Teaching College Science, total 3 credits, not required for the Certificate)
- Participation in a "significant, mentored, independent teaching experience".
- Completion of a Professional Portfolio (*vide infra*).

The Professional Portfolio will typically include:

- Curriculum vitae, transcript, copies of manuscripts and published papers, and a brief description of the research work performed here.
- A list of all the courses taught, including a brief description of the course, the nature of the student's involvement, manner of instructional participation, and the number of students.
- Sample video tapes (a minimum of one each semester as a Teaching Associate) of sample lecture/laboratory sessions.
- A statement from the Graduate School describing the all-University Teaching Assistant Program and related initiatives.
- A record of one or two courses recently taught including; (1) student handouts (including syllabi, quizzes, exams, assignments, etc...), (2) copies of student evaluation surveys (as appropriate), and (3) a list of the work that was graded and a brief statement of the philosophy employed in the grading.
- A personal "Philosophy of Teaching" statement.

Faculty Teaching Mentors will be responsible for:

- Overseeing the overall operation of the program. Faculty mentors will guide the CHE 799 seminars for the Teaching Associates. This will include an evaluation of the Teaching Associate's performance and regular meetings with their Teaching Associates to discuss pedagogical development.
- Participating in the Teaching Assistant to Teaching Associate promotion review process.
- Advising and assisting Teaching Associates in their professional development including assisting them in designing a professional portfolio.
- Recruiting Teaching Associates and well as faculty mentors into the program.
- Mentoring Teaching Associates on an individual basis.
- Participating in activities associated with the program (both University-wide and departmental activities).
- Participating with other Faculty Teaching Mentors in recommending the awarding of the *Certificate in University Teaching* based upon applications of the Teaching Associates.

Pairing of Teaching Associates with Faculty mentors will be based upon research group assignments or teaching responsibilities.

V. **Program Benefits**

For graduate students involved in the program, an important benefit of involvement with the *Future Professoriate Program* is the opportunity to refine their teaching and communicative skills under careful faculty guidance. This should provide the graduate students with valuable professional enrichment regardless of their ultimate sector of employment.

For faculty members involved as Teaching Mentors, the primary benefit of the program is the enhancement of the overall efficacy of their teaching offerings. Any additional demands on their time must be focussed primarily on productive and meaningful work, such as mentoring graduate students, with a minimal emphasis placed on bureaucratic output.

VI. **Summary of the typical course for graduate students in chemistry in the *Future Professoriate Program*.**

Initial Year

- Initial Appointment as a Teaching Assistant
- Attendance at all-University new Teaching Assistant Program
- First basic teaching assignment (typically supervising laboratory and recitation classes in Freshman Chemistry, Organic Chemistry, Physical Chemistry or several other courses)
- Meetings with other Teaching Assistants and Teaching Associates to discuss pedagogical issues.
- Formal evaluation

Later Year(s)

- Appointment as a Teaching Associate
- Pairing with a faculty mentor.
- Completion of CHE 799 (General Chemistry Seminar, total 2 credits min.)
- 1 semester of SCI 544 (Teaching College Science, total 3 credits) is recommended
- Completion of requirements for the *Certificate in University Teaching Award*.
- Completion of Degree Requirements