

## Departmental Distinction in Chemistry

### Goals

The Departmental Distinction program in chemistry seeks to encourage and recognize students who give evidence of creative and independent scholarship. The process of attaining distinction in chemistry is designed to teach science and to communicate science effectively. A variety of opportunities exist by which students can take a greater responsibility for their own education. In particular, the Chemistry Department wishes to encourage students to move beyond the theory and structured laboratory setting of academic chemistry and into the realm of chemical research.

Students who wish to pursue graduation with distinction in chemistry will be motivated to do so for different reasons. In some instances, the skills and knowledge students gain by going through the process for distinction could play an important role in making a transition to their chosen post-graduation activity. Therefore, the department encourages students to consider their reasons for pursuing distinction in relation to their plans for after graduation. If future plans include gaining employment as a chemical scientist or admission to certain graduate or professional programs, it may be advantageous to complete the requirements for distinction before interviewing.

In such cases, we encourage students to complete elements 1-3 (and maybe 4, below) early enough in the senior year (or in the junior year) so that application process for post-graduate education or employment can take advantage of the student's involvement in the distinction process. Imagine going to a job interview armed with the final draft of a distinction paper to show and/or talk about. Imagine interviewing for admission to a graduate program and being able to offer concrete evidence of your ability to write and talk about chemistry. Imagine the letters of recommendation that the chemistry faculty can produce when you have completed the process of research, writing, and oral communication that are a part of the process of gaining distinction.

### Qualifications

In order to undertake the process of attaining departmental distinction, a student must

- be a declared chemistry major
- have a chemistry course GPA of 3.00 or greater; or have permission of the department
- have an overall GPA of 3.00 or greater, or have permission of the department
- have junior or senior standing

In order to be certified with Departmental Distinction in Chemistry, a student must

- finish the chemistry major and other graduation requirements
- maintain a chemistry course GPA of 3.00 or greater, or have departmental permission
- maintain an overall GPA of 3.00 or greater, or have departmental permission

The required elements for obtaining Departmental Distinction in Chemistry are

- engagement in an experiential learning activity,
- writing of a formal paper based on the experiential learning activity,
- oral presentation of the work to a small group of interested faculty (who have read the paper) for comments, suggestions and questions, and
- public oral presentation of the work (a seminar of a minimum of 12 minutes).

The process of gaining Departmental Distinction in Chemistry is a formative, rather than summative process. Students are expected to progress through the required elements in a manner that involves considerable learning at each step. The student seeking distinction works with their distinction mentor on each element of the process. Improving the student's ability to communicate science effectively is one of the primary goals of the distinction process.

## Required Elements

### *1. Experiential Learning Activities*

Experiential learning activities can take many forms. Some options include:

- Chemistry 298, Independent Study,
- Chemistry 394, Academic Internship.
- Chemistry 375, Advanced Laboratory,
- Chemistry 398, Independent Research,
- summer research at St. Olaf College, or
- summer research at another site.

Independent Study (Chemistry 298) allows a student to receive level II course credit for independent study projects that might involve experimental work or library research work. The interested student seeks out a faculty member willing to supervise the proposed project. This faculty member then becomes the student's distinction mentor.

Academic Internships (Chemistry 394) allows a student to receive course credit for working as a chemist. Eligible projects require students contribute a significant creative effort to the project. Working as a lab technician, while valuable experience, generally does not allow students to contribute to the creative effort. Students are advised to work with the Center for Experiential Learning (CEL) office to set up internship opportunities and to check with a chemistry faculty member to determine whether the project would qualify for distinction. The student will choose a chemistry faculty member to serve as their distinction mentor.

Independent Research (Chemistry 398) and Advanced Laboratory (Chemistry 375) allows a student to receive 1.0 or 0.25 level III course credits, respectively, for advanced, independent research. For either option, the interested student identifies a faculty mentor willing to oversee the project. This faculty member will serve as the distinction mentor.

On-campus summer research in the Chemistry Department is one of the most common ways of engaging in experiential work. Each fall faculty planning on conducting summer research publish brief descriptions of their projects. Early in the spring semester the same faculty present their research project ideas in a public forum, typically one of the chemistry department seminars. Interested students apply for positions and many are hired for the subsequent summer. The faculty member under whom the researcher works becomes the distinction mentor.

Off-campus summer research is also a popular summer activity for St. Olaf students. Summer research can be carried out at a wide variety of institutions, especially major research universities, some of whom offer summer undergraduate research programs. Some companies also have undergraduate research summer programs that involve projects in which the researcher provides a significant intellectual component to the work. Students pursuing off-campus research must have a St. Olaf chemistry department faculty mentor for the distinction process. It is best to identify the departmental distinction mentor before leaving for the summer. The faculty member or scientist with whom the work is actually accomplished (at the host institution) will serve as an additional mentor (and must give permission for the student to disseminate research results). Students pursuing this route are required to include the host institution mentor in the plans for distinction and to come back from the summer with a good start at the writing of an "Experimental" or "Materials and Methods" section for their paper.

Interdisciplinary projects conducted on- or off-campus are encouraged, but must maintain a chemical focus in order to be suitable for distinction in chemistry. Decisions about the suitability of projects will be made on a case-by-case basis by the chemistry department. For off-campus projects, the departmental distinction mentor makes this decision, in consultation with the Chemistry Department Leadership Triad, before a distinction faculty committee is named.

### *2. Presentation of a formal, written paper*

This paper should be based on the experiential learning activity chosen by the student. The written paper resulting from any of these experiential activities may be submitted to the distinction mentor at any agreed upon time. Students should consider their goals for distinction (see Introduction) and select an appropriate timeline for completing the requirements for distinction. Table 1 illustrates two timelines. Following the Fall timeline results in completion of all of the distinction requirements by mid-December of the senior year. This is optimal for those intending to leverage these experiences in landing their next position. The Spring timeline completes the requirements at the end of the senior year.

The distinction mentor and the student work together following the initial presentation of the rough draft to edit and adapt the paper as necessary to convey the work done in an acceptable and professional manner. A rough draft must be furnished at about the midpoint of either semester.

### *3. Presentation of the paper to a small faculty committee*

Students planning on pursuing distinction select a faculty committee in consultation with their faculty mentor. As seen in Table 1, this is the first formal step towards distinction and needs to be completed early in the semester under either timeline. This committee consists of three chemistry faculty (one is the mentor). If the distinction project is interdisciplinary, one faculty member with appropriate expertise from another department may be included in the committee.

When the distinction candidate and mentor are reasonably satisfied with the paper, a current draft is submitted to this faculty committee. The student works with the faculty members to determine a date and time (usually about one hour in length) for the committee to ask questions about the work, and to make comments or suggest changes to the paper. This meeting may begin with the student offering a brief oral synopsis of the work. The paper draft must be submitted to committee members in a timely fashion to allow at least one week to read the paper before the committee meeting. See Table 1 for specific deadlines for the two timelines.

At the conclusion of the committee meeting, the faculty committee will concur on what final changes, if any, should be made to the paper draft in order for it to be considered finalized. A final draft is prepared by the student and signed and dated by each of the committee members. Final drafts are kept on file in the chemistry department office. Final drafts must be signed, dated and submitted to the Chemistry Department Chair prior to the stated deadline (see Table 1).

### *4. A public oral presentation of the work*

Since a primary goal of the distinction process is to develop and improve skills in communicating science, a public oral presentation is required. Poster presentations, which are also of great value to improving communications skills, can not be substituted for the oral presentation requirement for distinction. Students are encouraged to present their work in poster format at the Science Symposium.

The oral presentation for distinction may take the form of a chemistry department student seminar or any number of undergraduate research meetings to which the student and/or mentor might travel. The distinction mentor will help the student plan a short oral presentation (a minimum of 12 minutes)

complete with professional quality visuals (slides, computer projection, overheads, etc.) On campus student seminars are often planned with three to four students in one seminar period. The public is welcome to attend. The oral presentation is not scored or graded in any way, but the distinction mentor will likely have a debriefing meeting with the student speaker to talk about the student's performance. The seminar can take place either before or after the meeting with the distinction committee. In some cases all elements of the distinction process except this one might be finished in the fall, but the seminar can take place in the spring in conjunction with other students fulfilling the requirements for distinction.

<b>Table 1. Deadlines* for Fulfilling the Requirements for Graduation with Distinction in Chemistry</b>		
<b>Event</b>	<b>Approximate Fall Deadlines</b>	<b>Approximate Spring Deadlines</b>
Identify on-campus mentor	September 15*	February 15*
Name faculty committee	October 1*	March 1*
Rough draft of paper due to faculty mentor	October 15*	March 15*
Revised draft of paper due to faculty committee	November 10*	April 10*
Deadline for committee meeting	November 25*	April 25*
Deadline for public presentation	December 10*	May 1*
Final signed paper due to Chemistry Department Chair	December 10*	May 1*

\*Dates may vary slightly year to year according to the college calendar.

See <http://www.stolaf.edu/depts/chemistry/major> for specific dates for the current academic year.