Chemistry – Ph. D.

<table>
<thead>
<tr>
<th>Program Learning Goals</th>
<th>Assessment Plans</th>
<th>Findings</th>
<th>Proposed Change</th>
<th>Closing the Loop (re-assessment)</th>
</tr>
</thead>
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| Acquisition of fundamental knowledge of modern chemistry. | **Outcomes**  
- Students must complete 24 credits of graduate-graduate coursework in chemistry with a grade of B or higher.  
- By the end of their 3rd year in the program students must collect 10 points in cumulative examinations.  
- Students must be able to analyze and discuss results published in the primary chemical literature.  
- Students must master the use of modern library resources.  
- Satisfactory teaching performance is required. | | | |
| **Role of the Program:**  
- The Graduate Program administers 4 entrance examinations which help to evaluate the strengths and weaknesses of the incoming students. The results of the examinations are used to determine whether a student will be allowed to transfer credits for any prior graduate coursework.  
- Graduate courses offered by the department are selected to reflect the current status of the field and the interests of the research-active faculty. Only grades of B or higher are satisfactory.  
- Monthly 3-hour cumulative examinations containing problems classified according to the major sub-disciplines represented in the department (organic, inorganic, analytical and physical) are administered to students and evaluated by graduate faculty.  
- A mandatory Research Seminar course is offered for the first | | | |

year Ph.D. students. The course involves training in the use of the on-site and on-line library resources, attendance of guest speaker seminars and a seminar presentation by the students.

- The teaching and research progress of all students is reviewed annually at a meeting of the graduate faculty which is held each Spring semester. Students whose teaching or research performance is deemed unsatisfactory receive warning letters which detail the specific concerns and aspects in need of improvement.

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<th>Engagement in the conduct of individual research and teaching.</th>
<th>Outcomes:</th>
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<td>• Students are required to select a Ph.D. Research Advisor by the end of the first semester in the program.</td>
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<td>• In the course of their Ph.D. work students will acquire mastery of modern synthetic, instrumental and theoretical techniques and become experts in the respective area of chemistry.</td>
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<td>• Students will produce a substantial body of original research which will serve as the basis for several publications in peer reviewed journals.</td>
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<td>• Students must accumulate 36 credit hours of Ph.D. research.</td>
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<td>• Students will write a Ph.D. thesis and successfully defend it.</td>
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<td>• All Teaching Assistants will demonstrate the ability to supervise undergraduate laboratory sessions, instruct and evaluate undergraduate students.</td>
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**Role of the Program:**

- The Graduate Program Coordinator guides students through the process of selecting the Research Advisor. All research-active faculty members eligible to accept new Ph.D. students present
20-minute reviews of the current and available research projects. Furthermore, new students must meet individually and discuss research with at least 4 faculty members before the final selection of the advisor can be made.

- The Department regulates the distribution of Ph.D. students in accordance with the advisor’s ability to provide research resources and funding.
- The Department maintains a wide array of state-of-the-art research instruments which are available for direct use by the graduate students. Hands-on training and one-on-one instruction is provided by two Ph.D. level staff members as well as the research advisors.
- The progress of Ph.D. research is assessed in periodic group meetings, through written reports and in individual discussions with the thesis advisor.
- No less than 6 months before the Ph.D. defense the overall status of the research project is evaluated by the Ph.D. thesis committee which gives feedback and advice to the student.
- Students are provided with ample teaching opportunities ranging from the supervision of undergraduate laboratory classes in general, organic, inorganic and physical chemistry to conducting recitations and review sessions. Their responsibilities include grading of examinations and evaluation of written laboratory reports which afterwards are reviewed by the supervising faculty member.
- The teaching and research progress of all students is reviewed annually at a meeting of the graduate faculty which is held each Spring semester. Students whose teaching or research performance is deemed unsatisfactory receive warning letters
which detail the specific concerns and aspects in need of improvement.

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<th>Preparation for independent research and teaching career.</th>
<th><strong>Outcomes:</strong></th>
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<td>• Students must know how to prepare proposals for original scientific research. Students will prepare and defend a written proposal for their independent research idea. The proposal will include appropriate reviews of relevant work, the rationale for the project, and details about the required research methodology.</td>
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<td>• Students will be able to effectively present the results of their research external meetings.</td>
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<td>• Students must be able to write research reports in professional, concise and grammatically correct English.</td>
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<td>• Students must be able to effectively communicate with their coworkers and superiors.</td>
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**Role of the Program**

• A committee of graduate faculty will review the student's independent research proposal and participate in an oral defense of the work. The originality of the idea, logical choice of methodology and the quality of the presentation determine the outcome of the defense.

• Individual mentoring and career guidance are provided by the research advisors and the Program Coordinator.

• Students are encouraged by the advisors and by the Program to present the results of their research results at local and national scientific meetings and conferences.

• Under the guidance of the research advisors students write and publish papers in peer reviewed journals.
The Department runs an active guest research seminar program. Students are expected to attend the seminars and encouraged to meet with the visiting scientists from academia, industry and national laboratories. The Department sponsors lunches for groups of Ph.D. students and visitors.

The teaching and research progress of all students is reviewed annually at a meeting of the graduate faculty which is held each Spring semester. Students whose teaching or research performance is deemed unsatisfactory receive warning letters which detail the specific concerns and aspects in need of improvement.
Chemistry – M. S.

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| Acquisition of fundamental knowledge of modern chemistry. | **Outcomes:**  
- Students must complete 24 (30 for the coursework based degree) credits of graduate coursework in chemistry with a grade of B or higher.  
- By the end of their 2nd year in the program students must collect 2 points in cumulative examinations.  
- Students must be able to analyze and discuss results published in the primary chemical literature.  
- Students must master the use of modern library resources. | | | |

**Role of the Program:**  
- The Graduate Program administers 4 entrance examinations which help to evaluate the strengths and weaknesses of the incoming students. The results of the examinations are used to determine whether a student will be allowed to transfer credits for any prior graduate coursework.  
- Graduate courses offered by the department are selected to reflect the current status of the field and the interests of the research-active faculty. Only grades of B or higher are satisfactory.  
- Monthly 3-hour cumulative examinations containing problems classified according to the major sub-disciplines represented in the department (organic, inorganic, analytical and physical) are administered to students and evaluated by graduate faculty.  
- A mandatory Research Seminar course is offered for the first
| Engagement in the conduct of individual research | Outcomes:  
- M.S. students who wish to pursue the research based degree must select the research advisor during their first semester in the program.  
- In the course of their work students will acquire technical mastery of modern synthetic, instrumental and theoretical techniques.  
- Students will produce a body of original research which will serve as the basis for publication in a peer reviewed journal.  
- Students must accumulate 6 credit hours of M.S. research.  
- Students will write an M.S. thesis and successfully defend it.  
Role of the Program  
- The Graduate Program Coordinator guides students through the process of selecting the Research Advisor.  
- The Department maintains a wide array of state-of-the-art research instruments which are available for direct use by the graduate students. Hands-on training and one-on-one instruction is provided by two Ph.D. level staff members as well as the research advisors.  
|
| Preparation for independent research career. | **Outcomes:**  
- Graduating M.S. students will have the technical expertise to carry out supervised projects in industry and academia.  
- Students will be able to effectively present the results of their research at meetings.  
- Students will be able to write research reports in professional, concise and grammatically correct English.  
- Students will be able to effectively communicate with their coworkers and superiors.  
**Role of the Program**  
- Individual mentoring and career guidance are provided by the research advisors and the Program Coordinator.  
- Students are encouraged by the advisors and by the Program to present the results of their research results at local and national scientific meetings and conferences. |
- Under the guidance of the research advisors students will write and publish papers in peer reviewed journals.
- The Department runs an active guest research seminar program. Students are expected to attend the seminars and encouraged to meet with the visiting scientists from academia, industry and national laboratories.
- Research progress of M.S. students by the respective advisors and the Graduate Program Coordinator. Students research performance is deemed unsatisfactory receive warning letters which detail the specific concerns and aspects in need of improvement.