Program

PhD Program in Pharmaceutical Sciences

Department

College
College of Pharmacy

Year
2014

Primary Faculty:
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Faculty Committee:
Giovanni Pauletti
Gary Kelm
Pankaj Desai
I. Program Overview

Your program overview should incorporate the values and philosophy of the program, and the vision of what students will be able to do upon completion of the program. A program overview might include a brief history and philosophy of the program, the type of students to be served, the academic environment and primary focus of the curriculum, faculty roles, the contributions to and connections with the community, the role of research, and a stated commitment to diversity and nondiscrimination. A program overview should consistent with the University of Cincinnati mission statement and written with the student audience in mind.

The Pharmaceutical Sciences Graduate Program resides within the James L. Winkle College of Pharmacy at the University of Cincinnati. The program offers the opportunity for students to earn a MS or PhD degree with a research focus in biomembrane, drug development, and health outcomes. Within the subdiscipline of biomembrane students may elect to further focus on cosmetic and skin sciences. The cosmetic sciences/skin sciences subdiscipline is one of the few PhD programs in the United States and the world.

The mission of the program is to train highly skilled pharmaceutical sciences researchers. These graduates will become scientists and researchers who have specialties in the areas of biomembrane, drug development, or health outcomes. They will forward knowledge of pharmaceutical sciences throughout the world. The program has local, national, and international impacts through our graduates’ positions in academia, industry, and government. Our graduates go to positions that extend beyond the traditional academic career model. For example, our graduates often hold tenure-track or research faculty positions at research based institutions. Our graduate program provides training in the basic research skills necessary for success in this area. In addition to relevant background course work, emphasis is placed on scientific writing, oral presentation skills and grant proposal preparation. Faculty supervisor and the dissertation committee also prepare our students for postdoctoral training.

Numerous alumni of our program have successfully obtained positions in pharmaceutical companies. Some of our students have pursued short-term internships offered by companies, e.g., Procter & Gamble and Amway. Our graduates have also obtained permanent positions at the US Food and Drug Administration (FDA) in the area of regulatory affairs. Our training provides these graduates the knowledge and skills that they are well-positioned to obtain jobs in government agencies such as National Institutes of Health (NIH), National Science Foundation (NSF) or FDA. Graduates who have chosen to pursue careers in the areas of health outcomes and administrative science have obtained positions in hospital pharmacies or become managers of outcomes research in private health care companies.
II. Program Outcomes

Please include in this section your program learning outcomes as they are listed in the P-1 form in eCurriculum. If you are already planning to revise those program learning outcomes, indicate in this section which ones might be changed, and what the new program learning outcomes are likely to be. In general, learning outcomes should be measurable, assessable, or observable in some way and aligned with national standards.

- Describe the fundamental concepts in pharmaceutical sciences and apply their basic science knowledge to pharmaceutical science applications.

- Design, implement, and perform independent and original research in an area of pharmaceutical sciences.

- Analyze and present experimental results of research in pharmaceutical sciences.

- Identify problems in their research, provide strategy to analyze the problems, and solve the problems.

- Evaluate relevant literature to identify new approaches in research.

- Create new knowledge from the existing knowledge in pharmaceutical sciences.

- Develop effective written communication and oral presentation skills to defend the findings to the pharmaceutical science community.

- Learn a research topic independently using the scientific literature with the science knowledge they obtained and the skills they developed in the program.
III. Curriculum/Program Map

Please include in this section a grid that identifies connections that exist between required courses in this program and the corresponding program-level learning outcomes. In other words: how will program outcomes be met? This grid should further indicate the expected levels of learning at each level (whether emerging, strengthening, or achieved). The CET&L web site includes templates that you might find useful in completed this grid.
# Curriculum Mapping Matrix: Linking Program Outcomes to Curriculum

<table>
<thead>
<tr>
<th>Key</th>
<th>Required Courses and Experiences&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Identified in P-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>E: Emerging&lt;br&gt;D: Developing&lt;br&gt;A: Achieved</td>
<td>Prin Pharm Sci &amp; core courses&lt;sup&gt;b&lt;/sup&gt;&lt;br&gt;Statistics&lt;br&gt;Ethnics&lt;br&gt;Journal Club&lt;br&gt;Seminar Class&lt;br&gt;Research in Pharm Sci&lt;br&gt;Qualifying Exam&lt;br&gt;Dissertation Research&lt;br&gt;Thesis Defense</td>
<td></td>
</tr>
</tbody>
</table>

## OUTCOMES

1. **Describe the fundamental concepts in pharmaceutical sciences and apply their basic science knowledge to pharmaceutical science applications.**
   - E<br>Prin Pharm Sci & core courses
   - E<br>Statistics
   - E<br>Ethnics
   - E, D<br>Journal Club
   - D, A<br>Seminar Class
   - D, A<br>Research in Pharm Sci
   - D, A<br>Qualifying Exam
   - D, A<br>Dissertation Research
   - A<br>Thesis Defense

2. **Design, implement, and perform independent and original research in an area of pharmaceutical sciences.**
   - E<br>Prin Pharm Sci & core courses
   - D<br>Statistics
   - D<br>Ethnics
   - D<br>Journal Club
   - A<br>Seminar Class
   - A<br>Research in Pharm Sci
   - A<br>Qualifying Exam
   - A<br>Dissertation Research
   - A<br>Thesis Defense

3. **Analyze and present experimental results of research in pharmaceutical sciences.**
   - E<br>Prin Pharm Sci & core courses
   - D<br>Statistics
   - D<br>Ethnics
   - D<br>Journal Club
   - A<br>Seminar Class
   - A<br>Research in Pharm Sci
   - A<br>Qualifying Exam
   - A<br>Dissertation Research
   - A<br>Thesis Defense

4. **Identify problems in their research, provide strategy to analyze the problems, and solve the problems.**
   - E<br>Prin Pharm Sci & core courses
   - E<br>Statistics
   - E<br>Ethnics
   - E<br>Journal Club
   - D, A<br>Seminar Class
   - D, A<br>Research in Pharm Sci
   - D, A<br>Qualifying Exam
   - D, A<br>Dissertation Research
   - A<br>Thesis Defense

5. **Evaluate relevant literature to identify new approaches in research.**
   - E<br>Prin Pharm Sci & core courses
   - E<br>Statistics
   - E<br>Ethnics
   - E<br>Journal Club
   - D, A<br>Seminar Class
   - D, A<br>Research in Pharm Sci
   - D, A<br>Qualifying Exam
   - D, A<br>Dissertation Research
   - A<br>Thesis Defense

6. **Create new knowledge from the existing knowledge in pharmaceutical sciences.**
   - E<br>Prin Pharm Sci & core courses
   - D<br>Statistics
   - D<br>Ethnics
   - D<br>Journal Club
   - A<br>Seminar Class
   - A<br>Research in Pharm Sci
   - A<br>Qualifying Exam
   - A<br>Dissertation Research
   - A<br>Thesis Defense

7. **Develop effective written communication and oral presentation skills to defend the findings to the pharmaceutical science community.**
   - E<br>Prin Pharm Sci & core courses
   - E<br>Statistics
   - E<br>Ethnics
   - E<br>Journal Club
   - A<br>Seminar Class
   - A<br>Research in Pharm Sci
   - A<br>Qualifying Exam
   - A<br>Dissertation Research
   - A<br>Thesis Defense

8. **Learn a research topic independently using the scientific literature with the science knowledge they obtained and the skills they developed in the program.**
   - E<br>Prin Pharm Sci & core courses
   - D<br>Statistics
   - D<br>Ethnics
   - D<br>Journal Club
   - A<br>Seminar Class
   - A<br>Research in Pharm Sci
   - A<br>Qualifying Exam
   - A<br>Dissertation Research
   - A<br>Thesis Defense

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<sup>a</sup> Identified in P-1

<sup>b</sup> Prin Pharm Sci & core courses
Only required courses and experiences that are housed within our academic unit are identified.

Evaluated using common rubrics.
IV. Methods and Measures

Please include in this section a description of the assessment methods that your program plans to use in assessing each of its program learning outcomes. These methods ideally include both direct and indirect examples of student learning, with authentic, performance-based assessment performed at all levels. You may find it helpful to include the “Assessment Measures Alignment Matrix” from Activity 5.
<table>
<thead>
<tr>
<th>Program Outcome</th>
<th>Assessment Tools</th>
<th>Course/ Experience</th>
<th>Time Line</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the fundamental concepts in pharmaceutical sciences and apply their basic science knowledge to pharmaceutical science applications.</td>
<td>The core courses provide the basic knowledge in science and research (E). Knowledge is evaluated using common rubrics. Students complete an oral presentation once per year and participate in group discussions (E, D) During the qualifying exam, committee members evaluate the student’s knowledge (D, A)</td>
<td>Prin Pharm Sci, Statistics, and Ethics</td>
<td>1st and 2nd year</td>
<td>Plan of Study committee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Journal Club</td>
<td>Fall semester every year</td>
<td>Journal Club course director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualifying Exam</td>
<td>2nd or 3rd year</td>
<td>Members of Plan of Study committee</td>
</tr>
<tr>
<td>Design, implement, and perform independent and original research in an area of pharmaceutical sciences.</td>
<td>Students give an oral presentation once per year on research for faculty to assess and receive feedback in seminar (E, D) Students provide oral report to their faculty advisor and receive feedback as part of their on-going thesis research (E, D) Students give a final presentation and written document of their thesis research in their last semester (A)</td>
<td>Seminar Class</td>
<td>Spring semester every year</td>
<td>Seminar course director and faculty in the audience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research in Pharm Sci</td>
<td>Every semester in 1st and 2nd year</td>
<td>Thesis advisor and members of thesis committee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dissertation Research</td>
<td>Every semester after qualifying exam</td>
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<td>Thesis Defense</td>
<td>Final semester</td>
<td></td>
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<td>Analyze and present experimental results of research in pharmaceutical sciences.</td>
<td>Students give an oral presentation once per year on research for faculty to assess and receive feedback in seminar (E, D)</td>
<td>Seminar Class</td>
<td>Spring semester every year</td>
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<tr>
<td></td>
<td>Students provide oral report to their faculty advisor and receive feedback as part of their on-going thesis research (E, D)</td>
<td>Research in Pharm Sci</td>
<td>Every semester in 1st and 2nd year</td>
<td>Thesis advisor and members of thesis committee</td>
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<td>Students give a final presentation and written document of their thesis research in their last semester (A)</td>
<td>Dissertation Research</td>
<td>Every semester after qualifying exam</td>
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</tr>
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<td>Identify problems in their research, provide strategy to analyze the problems.</td>
<td>Students provide oral report to their faculty advisor and receive feedback as part of their on-going thesis research (E)</td>
<td>Thesis Defense</td>
<td>Final semester</td>
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<td></td>
<td>Students provide oral report to their faculty advisor and receive feedback as part of their on-going thesis research (D, A)</td>
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<td>Evaluate relevant literature to identify new approaches in research.</td>
<td>Students complete an oral presentation once per year and participate in group discussions (E)</td>
<td>Journal Club</td>
<td>Fall semester every year</td>
<td>Journal Club course director</td>
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<tr>
<td></td>
<td>During the qualifying exam, committee members evaluate the student’s ability to conduct independent and original research (D, A)</td>
<td>Qualifying Exam</td>
<td>2nd or 3rd year</td>
<td>Members of Plan of Study committee</td>
</tr>
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<td>Create new knowledge from the existing knowledge in pharmaceutical sciences.</td>
<td>The core courses provide the basic knowledge in science and research (E). Knowledge is evaluated using common rubrics.</td>
<td>Prin Pharm Sci and other core courses</td>
<td>Every semester in 1st and 2nd year</td>
<td>Plan of Study committee</td>
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</tr>
<tr>
<td>Students provide oral report to their faculty advisor and receive feedback as part of their on-going thesis research (D)</td>
<td>Dissertation Research</td>
<td>Every semester after qualifying exam</td>
<td>Thesis advisor and members of thesis committee</td>
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<td>Students give a final presentation and written document of their thesis research in their last semester (A)</td>
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<th>Develop effective written communication and oral presentation skills to defend the findings to the pharmaceutical science community.</th>
<th>Students give an oral presentation once per year on research for faculty to assess in seminar (E, D)</th>
<th>Seminar Class</th>
<th>Spring semester every year</th>
<th>Seminar course director and faculty in the audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students give a final presentation and written document of their thesis research in their last semester (A)</td>
<td>Thesis Defense</td>
<td>Every semester after qualifying exam</td>
<td>Thesis advisor and members of thesis committee</td>
<td></td>
</tr>
<tr>
<td>Students submit at least one paper to publish their research with the assistance of their thesis advisor (A)</td>
<td>Dissertation Research</td>
<td>Final semester</td>
<td>Graduate Program Committee</td>
<td></td>
</tr>
</tbody>
</table>

| Learn a research topic independently using the scientific literature with the science knowledge they obtained and the skills they developed in the program. | The core courses provide the basic knowledge in science and research (E). Knowledge is evaluated using common rubrics. | Prin Pharm Sci and other core courses | Every semester in 1st and 2nd year | Plan of Study committee |
| During the qualifying exam, committee members evaluate the student’s knowledge (D, A) | Qualifying Exam | 2\textsuperscript{nd} or 3\textsuperscript{rd} year | Members of Plan of Study committee |
IV. Assessment Infrastructure

Please include in this section a description of the process by which your program intends to assess its learning outcomes.

- Describe which program faculty will be charged with overseeing the execution of the assessment plan as well as the ways in which they will carry out that charge, including a description of the planned timeline for assessment.
- Identify what kinds of administrative support will be available for those faculty.

Please note that assessment plans should be capable of producing reports annually based on their review of the relevant data from their programs. The work of your faculty might also be coordinated and aligned with similar assessment efforts at the college and institutional levels.

Assessment Personnel

The Graduate Program Assessment Committee (GPAC) is comprised of five graduate training faculty, one alum, and one current MS/PhD student. Equal representation of graduate training faculty with teaching responsibilities in various tracks is required. The composition and charges of this committee are subject to all-faculty approval for inclusion in the College By-Laws. The GPAC is the coordinating body through which faculty-driven assessment for the Graduate Program is carried out. The GPAC is charged with the development of assessment plans, processes, and evaluation of assessment data. All new processes developed are then vetted by the entire Graduate Program Committee (GPC) before seeking approval by all graduate training faculty. All assessment data viewed by the GPAC is provided to the GPC for review and action, if necessary. Typically, curricular and assessment information and resulting recommendations are subsequently disseminated to graduate training faculty for final approval. The GPAC and GPC are administratively supported by an Assistant Director for Graduate Studies.

Assessment Schedule

Data are collected annually at the end of the spring semester for course-embedded assessments. Qualifying exam, Committee meeting reports, and Thesis defense data are collected throughout the academic year. However, data analysis of these administrative experiences is conducted during the summer months together with the self-reflection submitted by graduate students as part of the annual report requirement. The results of this analysis will be reviewed by the GPAC in September, and findings are reported to the GPC in October. Specifically, the GPAC report will address whether program outcomes are met or deficiencies have been identified that require programmatic adjustments. Initially, these reports will be used to generate baseline data. After 2-3 years of data collection, the GPC will use these baseline data to define expected levels of achievement for each program outcome. If deficiencies are identified, the Graduate Program Director will lead discussions within the GPC on potential strategies that could effectively correct the issues identified. Possible strategies include refinement of assessment tools and revision of course-specific learning outcomes. Assistance from CET&L can be requested to help facilitating implementation of necessary adjustments.
V. Findings

Here you will describe and explain in this section any multi-year patterns and trends that your assessment efforts have identified, including a description of any relevant relationships to national standards.

VI. Use of Findings

In this final section, you will describe how your program intends to make use of the program-level assessment data it has gathered.

- How will this information be presented to and discussed among the faculty?
- How might this data or these discussions result in review and possible revision of course or program learning outcomes and pedagogical strategies?