Dissertation learning goals:

First, the Ph.D. dissertation in Biochemistry is the capstone written document that presents the results and interpretation of years of laboratory research work. Its value is assessed by the research mentor and a committee of scientists that have followed the progress of the research generally from the second to the final year a student remains in the program. Such assessment is in part ad hoc in that criteria for a successful outcome are derived from how mentor and committee members judge the value of the research as described in the thesis against their own knowledge and expertise. Criteria for the thesis committee generally include an assessment of the value of the research against the current knowledge in the field and how the student’s contribution advances that knowledge. Thesis committee members will have been chosen because of their extensive experience and background in the field of the student’s research. The program, by evaluating and approving the selection of the thesis committee members in agreement with mentor and student entrusts the assessment of the thesis to this committee.

Assessment of the student’s contributions to the field occur during the oral thesis defense. In the dissertation, the student is called upon to demonstrate mastery of multiple levels of learning, from the basic remembering of basic facts that may be asked during the thesis defense, to higher levels like analyzing and evaluating experimental data, and being able to defend their interpretations. The student should be able to demonstrate the ability to design, conduct, analyze, and evaluate experiments in field of modern biochemistry. The student also needs to be able to communicate these results with proficiency in a public “seminar” and to further defend the results when questioned by the committee in a private session. A successful outcome for the dissertation means that the written document and the oral defense have both met with the approval of the committee.

Additional assessment of the scientific content of the dissertation in most cases may come from external peer review of manuscripts submitted for publication in science journals. Acceptance of a manuscript for publication in a first-authored, peer-reviewed journal demonstrates that the student can create new research regarded as significant by scientists in the biochemistry community beyond the local thesis committee.

Data drawn from:

Examination of the dissertation and evaluation of the oral defense is performed by a committee comprised of five scientists bringing appropriate expertise and experience, including the mentor, two other Biochemistry Program faculty often at the student’s home campus, and two other biochemists, at least one of which is on a faculty outside the Biochemistry Program. The data from students and committee members is limited since the only forms they are required to sign off on is the results of the exam.
Findings:
There have been no cases of Biochemistry Ph.D. students failing their dissertation in the past decade, so at face value the dissertation is effective since students are passing this exam, with no revisions, minor revisions (mentor-only will review the edits), or major revision (mentor and two committees. However, the length to degree is approximately 6 years, and taking this long to complete the dissertation may put students at a disadvantage in the job market.

Proposed changes:
The Program will look into producing a checklist for the written and oral defense for the committee with specific criteria. For example, does the student’s work advance the field incrementally or more significantly; does the student demonstrate sufficient background knowledge in the research field; is the work publishable or already published; and is the oral presentation of a caliber that would be well received at a scientific conference?

Next steps:
The Biochemistry Curriculum Committee will look into proposed changes when they meet in the next academic year.