

Department/Unit Chemistry and Biochemistry College/School CNSM

Student Learning Outcomes and Assessment Report for Biochemistry and Molecular PhD Program (Name changed to Biochemistry and Neuroscience in 2014)

Based upon a meeting on the first day of July, 2014, Tom Kuhn, Larry Duffy, Kriya Dunlap, Brian Edmonds and Kelly Drew considered the learning outcomes and prepared the following SLOA report

Biochemistry and Molecular Biology Ph.D. program

NOTE: This is a new document for the Academic year 2010-11. Please contact Bill Simpson or the Provost's office for prior years.

	Fall 2012-Spring 2013	Fall 2013- Spring 2014
Assessment information	<p><i>Graduate program assessments were collected from 3 BMB PhD students, 2 students were in the first year and 1 student was in the second year of the program. The values below represent the percentage of these 3 students who were above, below or at the level expected for their year in the program. In addition faculty met to share impressions of how the program was serving the BMB PhD students.</i></p> <p>1. Specific knowledge of literature 67%</p>	<p><i>Graduate program assessment forms were compiled in May/June 2014 and results were analyzed by considering whether students were deficient (below the expected level for their year in program), at expectation, or exceeding expectations. In addition faculty met to share impressions of how the program was serving the BMB PhD students.</i></p> <p><i>The percent of students exceeding the expectation minus the percent of deficient students is tabulated below:</i></p>

Department/Unit	Chemistry and Biochemistry	College/School	CNSM
	<div>2. Ability to critically analyze literature 67%</div> <div>3. Technical abilities 33%</div> <div>4. Quantitative abilities 67%</div> <div>5. General knowledge of field 67%</div> <div>6. Presentation skills 67%</div> <div>7. Writing Skills 67%</div> <div>8. Ability to formulate hypotheses and articulate methods for testing hypotheses (Ph.D.) 67%</div> <div>9. Ability to act as an independent researcher (Ph.D.) 67%</div> <div><p><i>The graduate program assessment summary indicates that our PhD students are meeting or exceeding expectations for their current year of study. However, the return of forms at the time this data was compiled was very low (25% return).</i></p><p><i>BMB core faculty also met to assess student learning outcomes and identified the following weaknesses in PhD student learning:</i></p><div><div>1. Weakness in advanced undergraduate biochemistry knowledge</div><div>2. Writing skills related to manuscripts, abstracts, posters and grants</div><div>3. Principles of receptor mediated signaling</div><div>4. Principles of intracellular signaling</div><div>5. Knowledge of professional networking</div><div>6. Lack of sufficient breadth in core BMB graduate courses to prepare</div></div></div>	<div>1. Specific knowledge of literature 17%</div> <div>2. Ability to critically analyze literature 8%</div> <div>3. Technical abilities 17%</div> <div>4. Quantitative abilities 8%</div> <div>5. General knowledge of field 25%</div> <div>6. Presentation skills 33%</div> <div>7. Writing Skills 17%</div> <div>8. Ability to formulate hypotheses and articulate methods for testing hypotheses (Ph.D.) 0%</div> <div>9. Ability to act as an independent researcher (Ph.D.) 17%</div> <div><p><i>These primary data are used to address our first three learning objectives.</i></p><p><i>For all criteria the students met or exceeded the expectations. Although students are meeting expectations for their ability to formulate hypotheses and articulate methods for testing hypotheses this was the lowest scoring area.</i></p><p><i>Publication data was collected and are in departmental records.</i></p><p><i>Employment: Two Ph.D.'s graduated in this AY period and both were employed in their field after graduation.</i></p></div>	

Department/Unit Chemistry and Biochemistry College/School CNSM

	<p><i>students for research.</i></p> <p>7. <i>Obstacles to student engagement in proposal preparation.</i></p>	
<p>Conclusions drawn from the information collected above and how are faculty collectively involved in drawing conclusions</p>	<p>1) <u>Technical abilities and presentation skills:</u> Students scored very well on points 3 (Technical), and 6 (Oral Presentations), and are met expectations on point 5 (General Knowledge of field) of the assessment survey. However, faculty impressions from student performance in courses are that students are weak in advanced undergraduate biochemistry knowledge. Faculty also noted deficiencies in basic knowledge in receptor mediated signaling, intracellular signaling. Faculty agree that these deficiencies are due to a lack of breadth in core BMB courses.</p> <p>2) <u>PhD will demonstrate independence and novel contributions:</u> The students met or were above expectations in the areas of points 1 (Specific Knowledge of literature), 2 (Ability to Critically analyze literature) and point 8 (Ability to formulate hypotheses). Taken together these results indicate that the students are spending adequate effort reading literature and generating hypothesis</p>	<p>1) <u>Technical abilities and presentation skills:</u> Students scored very well on points 3 (Technical), and 6 (Oral Presentations), and are met expectations on point 5 (General Knowledge of field) of the assessment survey. Annual progress reports also indicated good progress / performance in these areas.</p> <p>2) <u>PhD will demonstrate independence and novel contributions:</u> The students met or were above expectations in the areas of points 1 (Specific Knowledge of literature), 2 (Ability to Critically analyze literature) and point 8 (Ability to formulate hypotheses). Taken together these results indicate that the students are spending adequate effort reading literature and generating hypothesis specific to their projects.</p> <p>3) <u>Communications:</u> Students performed very well in oral (point 6) and written (point 7) communications.</p> <p>4) <u>Employment:</u> Employment of previous students remains very strong.</p>

Department/Unit Chemistry and Biochemistry College/School CNSM

	<p><i>specific to their projects.</i></p> <p>3) <u>Communications</u>: <i>The small sample size suggested that students are doing well in oral (point 6) and written (point 7) communications. However, faculty impressions of communication skills related to manuscripts, abstracts, posters and grants based on course work and PhD thesis work are that students are weak in these areas. Moreover, faculty find that PhD students lack professional skills especially in the area of professional networking.</i></p> <p>4) <u>Employment</u>: <i>Employment is strong, however the quality of post-doctoral positions could be enhanced by more effective networking and grantsmanship.</i></p>	
Curricular changes resulting from conclusions drawn above	<p>Emphasize requirement to attach detailed outline of research proposal in the student's Graduate Study Plan and require students to update the proposal and discuss cited literature in the context of their proposed research at each annual committee meeting.</p> <p>Give comprehensive exam from the previous year to entering students prior to their first</p>	<p>1) <i>No changes.</i></p> <p>2) <i>We are implementing a new incentive program to encourage students to prepare and submit research proposals to funding agencies. This change should encourage students to spend more time developing models with testable hypothesis, critically reviewing literature specific to their projects and provide a forum for getting feedback on their project hypothesis early on in their graduate career. In addition, to promote</i></p>

Department/Unit	Chemistry and Biochemistry	College/School	CNSM
	<p>semester to assess improvement in advanced biochemistry knowledge and to aid advisor in placing student in chem. 450.</p> <p>Design comprehensive exam questions to assess knowledge of principles of advanced undergraduate biochemistry.</p> <p>Recommendations regarding placement in chem 450 would be made by admissions committee and ultimately determined by the student's major adviser. Students may choose to audit or attend chem. 450 lectures as a means to prepare for the comprehensive exam.</p> <p>BMB faculty strongly supported the idea of the advance biochemistry course composed of modules usually taught in the different grad courses. The modules 'protein structure', 'membranes', 'gene expression', and 'cellular signaling' would be incorporated into the advanced course. Faculty suggested that we could offer this course in the spring 2013 as a special topics course for immediate action. The advanced course would also provide the basic knowledge that students would be responsible for on the comprehensive exam. Graduate courses would apply this basic knowledge to more theoretical, research focused topics.</p> <p>An opportunity to offer 400 level labs to</p>		<p><i>critical thinking and problem solving skills we will incorporate critical thinking into graduate courses by emphasizing the application of fundamental knowledge to solve current problems in the treatment of disease and biomedical problems.</i></p> <p>3) <i>No changes.</i></p> <p>4) <i>No changes.</i></p>

Department/Unit	Chemistry and Biochemistry	College/School	CNSM
	<p>complement newly designed Cell/Mol Biology, BIO 300 (O'Brien) would provide additional laboratory experience to prepare students for 600 level core courses. Laboratory experience would improve critical thinking and technical skills.</p> <p>Graduate colloquium in BMB is currently offered. Colloquium focuses on writing manuscripts, abstracts and proposals and professional networking. Consider making 4 semesters the colloquium (1 credit per semester a requirement for a BMB graduate degree.</p> <p>Special topics receptor pharmacology course will be offered spring 2013 and submitted for consideration as a graduate level course in BMB.</p> <p>Tom Kuhn has developed a course in cellular signaling. Student feedback has indicated significant demand for this course.</p> <p>Expand breadth of core requirements MS and PhD: choose 3 courses from the following courses CHEM F654—Protein Structure and Function—3 credits CHEM F657—Molecular Foundations of</p>		

Department/Unit	Chemistry and Biochemistry	College/School	CNSM
	<p>Gene Expression—3 credits</p> <p>CHEM F674—Membrane Biochemistry and Biophysics—3 credits</p> <p>CHEM (TBA) —Receptor Pharmacology</p> <p>CHEM F670 —Cellular & Molecular Neuroscience</p> <p>CHEM F675 —Cellular Signaling (New Course)</p>		