

# OUTCOMES ASSESSMENT PLAN

SCHOOL OF MOLECULAR AND CELLULAR  
BIOLOGY  
UNIVERSITY OF ILLINOIS AT URBANA-  
CHAMPAIGN

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## **Section I: The Process to Develop this Assessment Plan**

### **Current Practice**

Due to the development of the School of Molecular and Cellular Biology and the reorganization of departments and courses within the school, we are embarking on a new assessment plan. Courses were offered in the new program beginning Fall 2002.

This plan represents our first attempt to formalize the process we use to assess student learning in our program. This is constructed based on the input of Courses and Curriculum Committee, which consists of David Clayton, chair, Jim Imlay, Melissa Michael, Michael Glaser, Richard Tapping, Brenda Wilson, Michel Bellini, Claudio Grosman and Deb Bielser. We inventoried the measures that we currently employ in order to assess learning.

The information that we currently use includes:

- DMI information on IU, FTE
- DMI information on course offerings including frequency and rotation
- DMI information on class size and student to faculty ratios
- DMI information on degrees awarded
- DMI information on student GPA by class???
- ICES teaching evaluations (including student achievement items)
- senior surveys
- grading rubrics within core courses for assignments
- MCAT scores/med school acceptance???

## **Section II: Student Learning Outcomes**

### **Undergraduates**

MCB majors are required to take a core set of classes that consists of MCB 150, 250, 251, 252, 253 and 354. Students are then able to choose from a wide range of options available to them as advanced courses. The wide array of advanced course options makes it somewhat more difficult to assess learning in general terms in the upper level. Therefore, our focus for now will be on assessing learning within the core courses. Our undergraduate program serves to prepare students for graduate school, professional programs and employment in industry.

The desired learning outcomes of the core courses include but are not limited to:

- familiarity with (mastery of) content and concepts in the discipline,
- development of critical thinking skills
- development of problem-solving skills
- development of oral and written communication skills
- development of skills to work effectively in a group

- development of an awareness and understanding of current topics in relation to discipline

## **Graduates**

Graduate studies in MCB actually involve individual department affiliation. Our graduate program at both the Masters and PhD levels serves to prepare students to conduct research, convey findings and educate. Our graduate students are well-prepared to work in academia, at research institutions, in industry and for governmental agencies.

The desired learning outcomes for students earning a Masters degree include but are not limited to:

- acquisition of in-depth discipline knowledge
- development of abilities as a dependent researcher
- development of critical thinking and problem-solving skills
- development of the ability to critically assess new information and research
- development of ability to read primary literature
- development of oral and written communication skills

The desired learning outcomes for students earning a PhD include but are not limited to:

- acquisition of extensive discipline knowledge
- functioning as a competent and ethical independent primary investigator
- development of skills as an instructor
- development of critical thinking and problem-solving skills
- development of the ability to critically assess new information and research
- development of ability to read primary literature
- development of oral and written communication skills

## Section III: Measures and Methods

### Undergraduates

<b>Program Goals</b>	<b>Learning Objective</b>	<b>Curriculum Mapping</b>	<b>Assessment Item</b>
<i>What graduates should be able to do upon completing the program</i>	<i>How we know the program goals were met</i>	<i>Where the knowledge and skills are developed</i>	<i>How the learning objective achievement is measured</i>
familiarity with content in discipline	successful completion of core courses	MCB 150, 250, 251, 252, 354	course final grades of C or better, major GPA, courses ICES survey item
development of critical thinking skills	discussion debates	MCB 150	grading rubric
	course exams,	MCB 150, 250, 251, 252, 354	grade of C or better
	current topic presentations, lab notebook assignments,	MCB 251, 253	grading rubric
development of problem-solving skills	course exams	MCB 150, 250, 251, 252, 354	grade of C or better,
	discussion problem sets	MCB 250, 252, 354	rubric for classroom participation, courses ICES survey item
	lab notebook assignments	MCB 251, 253	grading rubric
development of oral & written communication skills	writing assignment, analysis of research paper	MCB 150 MCB 252	grading rubric for research paper, analysis
	debates	MCB 150	grading rubric
	lab notebook assignments	MCB 251, 252	grading rubric
	current topic presentations	MCB 251, 253	grading rubric
development of skills to work effectively in a group	satisfactory completion of lab exercises	MCB 251, 253	grading rubric for lab notebook assignments
development of awareness of current topics in discipline	current topic presentations	MCB 251, 253	grading rubric for presentations, courses ICES survey item
	course exams	MCB 250, 252	grade of C or better

### Graduates - Masters Students

<b>Program Goals</b>	<b>Learning Objective</b>	<b>Curriculum Mapping</b>	<b>Assessment Item</b>
<i>What graduates should be able to do upon completing the program</i>	<i>How we know the program goals were met</i>	<i>Where the knowledge and skills are developed</i>	<i>How the learning objective achievement is measured</i>
acquisition of in-depth discipline knowledge	Successful completion of MCB/IB courses 4XX-5XX	MCB/IB courses 4XX-5XX	GPA
development of abilities as a dependent researcher	Research report or Masters thesis	Primary research lab experience	Faculty evaluation and letters of recommendation
development of critical thinking skills	Research, group meetings	Primary research lab	Faculty assessment of project
development of ability to critically assess new research	Research, group meetings	Primary research lab	Faculty evaluation
development of ability to read primary literature	Group meeting presentations	Group lab meetings	Assessment of masters project
development of oral & written communication skills	Group meeting presentations, written chapter on research	Primary research lab	Assessment of masters project

### Graduates - PhD Students

<b>Program Goals</b>	<b>Learning Objective</b>	<b>Curriculum Mapping</b>	<b>Assessment Item</b>
<i>What graduates should be able to do upon completing the program</i>	<i>How we know the program goals were met</i>	<i>Where the knowledge and skills are developed</i>	<i>How the learning objective achievement is measured</i>
acquisition of extensive discipline knowledge	Students pass their qualifying exams	MCB 501, 502 BIOC/CDB/MICR/MIP 5XX Primary research lab	Performance at qualifying exam, in courses
functioning as an independent researcher	Students will publish or prepare a paper	DEPT 590, 599	Student presentation of paper to peers
development of skills as an instructor	Student will be evaluated positively by faculty observation and student ICES surveys	Teaching requirement of graduate program	ICES scores will be 2.0 or better

## **Section IV: Plans for Using Results for Program Improvement**

### **Undergraduate**

The curriculum committee reviews the data acquired on an annual basis. For the data that is specific to components within a course, such as a grading rubric or exam average, we use the information to assess and rework, if necessary, our teaching strategies, our content coverage and our expected outcomes. Our goal is to have students meet or exceed our standards. Using the data, we can make modifications in our courses to make sure that the standards are being met or exceeded. For the data that is pertinent to the course as a whole, we use the information to make modifications to our teaching approach, our course offerings and instructors. In our core courses especially, we are constantly trying different strategies in the classroom and as part of instruction. Some of the most recent strategies include incorporation and use of iClickers and LON-CAPA. In addition, we are trying different activities in our lecture discussion sections. At the close of a semester, we evaluate the data acquired. We then assess whether our changes have had a negative, unaltered or positive impact on the student performance in the course. We also take into consideration student evaluation comments about what they felt helped them meet our learning objectives. We then discuss and amend our practices accordingly.

There are a couple of items that we would like to include within the next five years. The first would be to do a new version of an exit survey. We would like to have cards at graduation for students to indicate to us their post-graduation plans. We would like to know if and where they are going to graduate school, professional school or employment. We would like to have the opportunity to survey these schools and employers with regard to the quality of our students. Secondly, we would be interested in doing a longitudinal study of our students during their tenure here, perhaps in the form of the National Survey of Student Engagement. We would like to see how students perceive their learning over the course of their education.

### **Graduate**

#### **Masters**

Masters students will continue to be assessed on the basis of their course performance and the quality of their research. Their qualifications as scientists, educators and government officials will continue to be monitored from within the department as well as the graduate college.

## **PhD**

PhD students will continue to be assessed during the course of their education through rigorous set of exams. The faculty will also continue to assess the quality of graduate student research and publications. Their qualifications as scientists, educators and government officials will continue to be monitored from within the department and the graduate college as well as through ongoing dialogues amongst the academic community.

## **Section V: Timeline for Implementation**

As stated above, the majority of what is described is already underway. The items that we would like to add would likely be done within the next two years, though most definitely by the fifth year.

## **Section VI: Resources and Support Needs**

Adding the items we are interested in would cause us to increase expenditures in material, services and personnel time.