

## ASSESSMENT FOR GRADUATE BIOLOGY MAJORS

### LEARNING OUTCOMES FOR GRADUATE BIOLOGY MAJORS

Students should be able to satisfy the outcomes listed below, and be able to satisfy requirements in these areas:

1. **Design** three PowerPoint presentations from the primary biological literature after learning how to dissect, understand, and explain research articles.
2. **Identify** a thesis research mentor by the end of the fall semester after completion of BIOL 5090.
3. **Analyze** experimental data using appropriate statistical methods.
4. **Interpret** the result of data analyses using an appropriate statistical methods.
5. **Develop** testable hypotheses after evaluating twenty primary literature articles and from other preliminary observations.
6. **Write** a coherent research proposal based on the testable hypotheses.
7. **Present** the written research proposal with the aid of presentation tools.
8. **Acquire** content knowledge in evolutionary mechanisms and the latest genomics technology.
9. **Apply** genomics content knowledge in solving problems in the student area of specialization.
10. **Write** a well-organized masters' thesis.
11. **Present/defend** thesis research to Chicago State University Community.

These outcomes are diagrammed in our **Curriculum Map for Graduate Majors** (K = Knowledge/comprehension, A = Application/Analysis, S = Synthesis/Evaluation):

Learning Outcome	Required Courses				
	BIOL 5090	BIOL 5015	BIOL 5040	BIOL 5100	BIOL 5700
1.	K, S				S
2.	K				
3.		A			A
4.		A			A
5.				K, S	S
6.				S	S
7.				S	
8.			K		
9.			A		
10.					S
11.					S

#### *What we looked at:*

Our goal is to train Master's-level graduate students to develop skills and content knowledge needed to complete a rigorous master's thesis research in a timely manner (approximately 2 to 3 years), so they graduate with a competitive degree. These skills are taught in four required courses: BIOL 5090 (Critical Analysis of Primary Literature), BIOL 5015 (Biometrics), BIOL 5100 (Research Methods) and BIOL 5040 (Genomics and Evolution). BIOL 5700 is our Thesis course.

#### *How we assessed it:*

We use a variety of instruments. In Biology 5090 students design three PowerPoint presentations from reading, dissecting, understanding and analyzing three primary biological literature articles. They then

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explain these research articles succinctly in front their peers. In addition, students are expected to identify a thesis research mentor by the end of the semester. In BIOL 5015, students analyze experimental data using appropriate statistical models and interpret the results. In BIOL 5100, students develop a testable hypothesis after reading and evaluating twenty primary literature articles and from other observations. They then must write a well-framed and concise research proposal based on at least one testable hypothesis, and present the written research proposal to the Department. In BIOL 5040, students acquire content knowledge in evolutionary mechanisms and latest genomics technology and apply this knowledge in solving problems in the student area of specialization.

### *What we found:*

For BIOL 5090, 92% of students earned at least 80% of the points awarded for the presentations. 80% of students, who had not previously identified a thesis research mentor at the beginning of the semester, either definitively choose a mentor or had commitments of acceptance by a mentor. In BIOL 5015, 60% of students were able to analyze and interpret data at the level of 80 to 100% graduate cutoff competency level. In BIOL 5100, 100 % of students who completed the course were able to develop testable hypothesis, wrote a research proposal that satisfied the 80% cutoff score for graduate competence level. 100 % of students presented the research proposal at the 90% competence level specified by the rubric scale. In BIOL 5040, 67% of students met the learning objectives of the course at the 80% graduate cutoff competence level.

### *What it means:*

More students (>50%) are choosing their thesis research mentor and writing the thesis proposal earlier in the program within the first year. This is good news, as it should translate to graduation in a timely manner. But, some students still have issues with analyzing data using statistics or turning assignments in on time.

### *What we're going to do about it:*

In the Fall 2012 semester, the instructor of BIOL 5090 will stress more vigorously the importance of participating in the discussion period following each presentation. He will consider assigning each student as a "primary discussant" for a particular presentation topic twice during the semester as a way of motivating students to be better prepared to engage in discussions about the topics presented. The instructor for BIOL 5015 will require homework be due at noon of the day class is taught at 6:00 pm to prevent students from skipping class. For BIOL 5100, the instructor will communicate with the student chosen thesis advisor about the progress being made at the different steps of the proposal writing process. For BIOL 5040, the instructor plans to incorporate more hands-on laboratory exercises in the future.

### *What happened:*

This is the second full year of implementing this revised graduate curriculum. We have seen that for this second full year close to 50% of students have defended their thesis proposal. We wait to see if this new strategy of course sequence will have an impact on timely graduation rates for the students. Nearly 100% of students who graduate from our Master's program either go on to professional or graduate schools or find jobs in the field.