



College	CoS
Department	Biological Sciences
Program Unit	M.S.
Reporting for Academic Year	2015-2016
Department Chair	Donald A. Gailey
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**COMMITTEE ON ACADEMIC PLANNING AND REVIEW
ANNUAL PROGRAM REPORT**

1. SELF-STUDY (about 1 page)

A. Five-year Review Planning Goals

1. Review the viability of the MA program
2. Assessment and transformation of MS curriculum for semester conversion
3. Increasing the number of non-tiered graduate courses for students pursuing a Master's Degree

B. Five-year Review Planning Goals Progress

The Master's Program in Biological Science was significantly transformed within the context of Semester Conversion. Major achievements of that transformation include:

1. Unanimous decision by Biology Faculty to withdraw the MA program. A majority of the Biology Faculty members are research-active, mentoring numerous undergraduate and Master's level students in their research laboratories. The department has a long history of allowing only the research thesis as the culminating experience for the M.S. degree. Barely passing with majority, the department decided a number of years ago to institute a M.A. program a comprehensive exam as the culminating experience. This proved very unpopular with faculty, was considered a "dilution" of the significance of the Master's degree in Biology, and this year was unanimously voted out of our Master's program. The controversial aspect of this decision remains, in that degree by thesis creates a bottleneck given the relatively small number of lab spaces available for thesis research. This is reflected in the relatively small size of our M.S. program (see below). Nevertheless the department stands by its decision to maintain a "high status" level of the degree, achieved only through successful defense of a research thesis.
2. Significant alteration of the MS curriculum for semester conversion. The research topics available to students bespeak the diversity of our faculty's research plans.

Traditionally the department has customized a course curriculum for each student—a treatment that makes standardized assessment of the program very difficult. To rectify this, the curriculum now has a common core curriculum in place exposing all students to the nature and practice of research (reading journal articles, developing the individual research plan, and writing of the thesis). The core includes now a generalized introductory year in advanced research topics in biology and focuses on development of research and writing skills. (see proposed assessment plan, below).

3. Regarding #3 above, the department voted unanimously to cease offering co-listed undergrad/grad courses. The entirety of the Master's curriculum now is 600-level, stand-alone Master's level courses. The department stands by its assessment that co-listing an undergraduate version of a Master's course only dilutes the value and quality of the experience for Master's students.

C. Program Changes and Needs

The thesis committee remains the governing body for the success of each Master's student and degree progress. The department will require formal, periodic meetings to assess each student's degree progress with the intent of achieving student completion rates of 2-3 years. This is in keeping with the overall campus mission to get student completion of degree work as quickly and directly as possible.

2. SUMMARY OF ASSESSMENT (about 1 page)

A. Program Student Learning Outcomes

1. Demonstrate a broad and sophisticated understanding that contributes to biological concepts and principles across all levels of biological organization, from ions to ecosystems.
Demonstrate expertise in a specific area of biological science.
Independently apply the scientific method to formulate testable biological hypotheses, analyze empirical data, and synthesize the results of the analysis.
Clearly communicate the design and results of an observational or experimental analysis in a variety of formats, including the graduate thesis, scientific paper, scientific poster, and oral presentation.
Gather and evaluate primary scientific literature and judge the value of the information presented in relation to particular biological questions.

B. Program Student Learning Outcome(s) Assessed

We did not assess any program learning outcomes in AY 2015-2016. That said, we did use the Oral Defense Rubric (See Appendix) in two oral defenses to assess ease of use.

C. Summary of Assessment Process

Assessment of PLOs 2, 3, 4 and 5: The capstone experience for our M.S. graduate students in the Department of Biology is the University Thesis (see Curriculum Map in the Appendix). To complete this capstone experience, our M.S. degree students must write a University Thesis and successfully defend their research in an “Oral Defense” in front of a committee of at least three faculty members. Going forward we plan to assess both the University Thesis and the Oral Defense using the Rubrics included in the Appendix. First, each member of the committee will complete an “Oral Defense Assessment Form” during the defense. After the oral defense, the scores will be discussed then submitted to the graduate coordinator for analysis and inclusion in the annual report. Second, the major thesis advisor (this will be optional for the committee members) will complete and submit a “Written Thesis Rubric” of the first draft of the thesis. This will give our department an idea of how proficient our students are at PLOs 2, 3, 4 and 5 in written format. Average scores above 80% for each PLO will signal success. Percentages that fall below 80% for specific PLOs will highlight areas where improvement is needed.

Assessment of PLO1: With Semester Conversion, we have rewritten our roadmap to ensure that our students take our courses in the correct order. Graduate Seminar will be taken after the Core II courses have been completed. Thus, our M.S. degree students should be able to demonstrate a broad and sophisticated understanding of biological concepts and principles across all levels of biological organization by the time they enter this course. While the department is still in the process of working out final details, one idea is to assess student’s general knowledge in a one broad area of research by asking the student’s enrolled in this course to complete a written exam on the first day of this course. Broad areas of research include Cell and Molecular Biology, Ecology, Physiology and Microbiology. We offer graduate seminar in each of these areas.

D. Summary of Assessment Results

We do not have any results to present at this time. In our preliminary assessment of two oral defenses completed during the Fall of 2016 we find that the Oral Defense Rubric will be an effective method for assessing PLOs 2, 3, 4 and 5 for AY 2016-2017.

3. STATISTICAL DATA (about 1 page)

California State University, East Bay
APR Summary Data
Fall 2011 - 2015

Biological Science					
	Fall Quarter				
	2011	2012	2013	2014	2015
A. Students Headcount					
1. Undergraduate	574	658	680	768	809
2. Postbaccalaureate	9	5	2	1	0
3. Graduate	35	41	44	32	28
4. Total Number of Majors	618	704	726	801	837
College Years					
B. Degrees Awarded					
	10-11	11-12	12-13	13-14	14-15
1. Undergraduate	91	91	133	103	131
2. Graduate	20	16	15	21	10
3. Total	111	107	148	124	141
Fall Quarter					
	2011	2012	2013	2014	2015
C. Faculty					
Tenured/Track Headcount					
1. Full-Time	13	13	14	14	15
2. Part-Time	1	0	0	0	0
3a. Total Tenure Track	14	13	14	14	15
3b. % Tenure Track	77.8%	72.2%	77.8%	77.8%	71.4%
Lecturer Headcount					
4. Full-Time	0	0	1	2	0
5. Part-Time	4	5	3	2	6
6a. Total Non-Tenure Track	4	5	4	4	6
6b. % Non-Tenure Track	22.2%	27.8%	22.2%	22.2%	28.6%
7. Grand Total All Faculty	18	18	18	18	21
Instructional FTE Faculty (FTEF)					
8. Tenured/Track FTEF	10.7	11.0	11.7	11.0	10.0
9. Lecturer FTEF	4.1	6.4	6.2	7.1	7.2
10. Total Instructional FTEF	14.8	17.4	17.9	18.1	17.2
Lecturer Teaching					
11a. FTES Taught by Tenure/Track	327.6	315.1	322.2	317.1	304.7
11b. % of FTES Taught by Tenure/Track	74.8%	63.6%	57.5%	57.3%	53.5%
12a. FTES Taught by Lecturer	110.5	180.6	237.7	235.8	264.6
12b. % of FTES Taught by Lecturer	25.2%	36.4%	42.5%	42.7%	46.5%
13. Total FTES taught	438.1	495.7	559.9	552.9	569.3
14. Total SCU taught	6571.0	7435.0	8398.0	8293.0	8539.0

D. Student Faculty Ratios					
1. Tenured/Track	30.6	28.6	27.6	28.8	30.5
2. Lecturer	26.9	28.4	38.2	33.4	36.7
3. SFR By Level (All Faculty)	29.6	28.6	31.3	30.6	33.1
4. Lower Division	37.9	35.4	38.7	38.3	41.4
5. Upper Division	24.5	24.4	30.6	27.8	27.3
6. Graduate	12.5	13.7	10.3	7.5	11.5
E. Section Size					
1. Number of Sections Offered	97.0	103.0	108.0	109.0	99.0
2. Average Section Size	34.3	35.3	39.5	36.2	38.9
3. Average Section Size for LD	39.6	39.1	42.2	39.7	42.1
4. Average Section Size for UD	29.4	31.3	37.4	31.6	35.2
5. Average Section Size for GD	13.0	18.0	15.3	20.0	14.0
6. LD Section taught by Tenured/Track	13	8	15	14	13
7. UD Section taught by Tenured/Track	36	32	29	38	28
8. GD Section taught by Tenured/Track	22	24	29	18	17
9. LD Section taught by Lecturer	26	35	32	34	35
10. UD Section taught by Lecturer	1	5	5	7	8
11. GD Section taught by Lecturer	0	0	0	0	0

Source and definitions available at:

<http://www.csueastbay.edu/ira/apr/summary/definitions.pdf>

Brief discussion (relevant Master's level data are highlighted in red, bold, increase-size font):

1. As discussed above, the number of students in the MS program at any given time is significantly restricted by the number of research-active faculty able to sponsor a student in research at any moment in time. This is usually one or two students per mentoring faculty member. There is a significant decline in MS students in 2015 which needs to be assessed and resolved (compare 2013= 44 students vs. 2015=28 students).
2. There was a significant drop in MS degrees granted to 10 in 2014-15. This number will likely rise with the decision to monitor more closely student progress toward the degree and completion of the thesis within 1-2 years. This will become an important component of future assessment.
3. Over the 5 year period of available data the MS program SFR has ranged from 7.5 to 13.7. The department resolves to maintain this at a low level to insure quality of student experience and resulting degree. The average class size has ranged from 13-20 over the 5 year period of available data. This number is predicted to range lower with the decision to stop offering undergrad/grad co-listed versions of classes.
4. No graduate course has been taught by a lecturer in the 5 year period of available data. This is imperative and speaks to consistent, high quality delivery of Master's level courses.

APPENDIX

A. Curriculum Map: Program Student Learning Outcomes (PLOs) are aligned to Required (R) and Elective (E) Courses below. Course numbers refer to the course numbers after Semester Conversion. During the course of writing this annual report, we realize that the curriculum map needs to be modified as shown below in red.

I = Introduce, D = Develop, M = Master and/or A= Assess.

Course title and new course number	R/E	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
Core I:						
Foundations of Scientific Research, 601A	R	x	x	I, D	I, D	I, D
Foundations of Scientific Communication, 601B	R	x	x	I, D	I, D	I, D
Core II: Choose at least 2 of the following courses with thesis advisor approval						
Cell and Molecular Biology I, 616	R	D	D	x	D	D
Cell and Molecular Biology II, 618	R	D	D	D	D	D
Microbial Physiology and Biochemistry, 631	R	P	D	D	D	D
Selected Topics in Ecology and Evolution, 652	R	D	D	x	D	x
Environmental Experimental Methods, 657	R	D	D	D	D	x
Advanced Topics in Physiology, 671	R	D	D	D	x	x
Seminar: Choose at least 1 but no more than 2 graduate seminars with thesis advisor approval						
Seminar in Cell and Molecular Biology, 610	R	M,A	D	D	D	D
Seminar in Microbiology, 630	R	M,A	D	D	D	D
Seminar in Ecology and Evolution, 650	R	M,A	D	D	D	D
Seminar in Physiology, 670	R	M,A	D	D	D	D
Electives:						
Prep. of Undergraduate Instruction in Biology, 602	E	D	D	x	D	x
Functional Genomics, 620	E	D	D	D	D	D
Advanced Molecular Techniques, 622	E	D	D	D	D	D
Community and Ecosystem Ecology, 653	E	D	D	x	D	x
Phylogenetic Methods, 655	E	D	P, M	D	D	D
University Thesis 691						
University Thesis 691	R	M	A	A	A	A

B. Rubrics to be used for the assessment of PLOs 2, 3, 4 and 5 using the oral defense or the University thesis.

Below are two rubrics that we plan to use to assess PLOs 2, 3, 4 and 5.

A description of an exemplary score is provided for each criteria listed below. An exemplary score is obtained for a given criteria when the description is always true. A proficient score is obtained when the description is usually true. A basic score is obtained when the description is sometimes true. ***Scores: 4 = Exemplary / Mastery, 3 = Proficient, 2 = Basic, 1 = Minimal.**

ORAL COMMUNICATION RUBRIC* (PLOs 2,4,5):

Criteria	Capstone / Mastery	SCORE*	PLO
Organization	Organizational pattern (introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.		4
Language	Language choices are imaginative, memorable, compelling, enhance the effectiveness of the presentation. and is appropriate to the audience.		4
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.		4
Supporting Material	Supporting material (answers to questions, explanations, examples, illustrations and analogies from trusted sources) support the presentation and central message and establish the presenter's authority on the topic.		2,4,5
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.).		4

INQUIRY AND ANALYSIS RUBRIC* (PLO 3):

Criteria	Capstone / Mastery	SCORE*	PLO
Topic selection	Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.		3
Existing Knowledge, Research, and/or Views	Synthesizes in-depth information from relevant sources representing various points of view/approaches.		2
Design Process	All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant subdisciplines.		3
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.		3
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.		3
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.		3

*Rubrics are modified from the VALUE Rubric Development Project (<https://www.aacu.org/value/rubrics>)

A description of an exemplary score is provided for each criteria listed below. An exemplary score is obtained for a given criteria when the description is always true. A proficient score is obtained when the description is usually true. A basic score is obtained when the description is sometimes true. ***Scores: 4 = Exemplary / Mastery, 3 = Proficient, 2 = Basic, 1 = Minimal.**

WRITTEN COMMUNICATION VALUE RUBRIC (PLOs 2,4,5):

Criteria	Capstone / Mastery	SCORE*	PLO
Organization	Organization of the Presentation. Introduction, sequenced material within the body, conclusion, and transitions are clearly and consistently observable and skillful. Overall, the content of the presentation is cohesive.		4
Language	Uses language appropriate to the discipline but is also appropriate for the audience as well. In other words, discipline specific language is defined where necessary.		2, 4, 5
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.		4
Supporting Material	Supporting material (explanations, examples, illustrations and analogies from trusted sources) appropriately reference the central message, support the presentation and establish the presenter's authority on the topic.		5
Central Message	Main claim is compelling (precisely stated, appropriately repeated, memorable, and strongly supported with evidence).		4

INQUIRY AND ANALYSIS VALUE RUBRIC (PLO 3):

Criteria	Capstone / Mastery	SCORE*	PLO
Topic selection	Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.		3
Background Knowledge of the Topic	Synthesizes in-depth information from relevant sources representing various points of view/approaches.		2
Design Process	All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant subdisciplines.		3
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.		3
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.		3
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.		3

*Rubrics are modified from the VALUE Rubric Development Project (<https://www.aacu.org/value/rubrics>)