**Annual Assessment Report**

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04 Assessment Plans and Summaries

Biological Sciences Assessment Plan

Describe Annual Assessment Plans

AY2017

(1) Department of Biological Sciences will continue to administer the Major Fields Test in GB 481 Senior Experience. Institutional “Total Score” and “Subscores” means will be compared to national average of institutions using the test.

We will also obtain Major Fields Test “assessment indicator” scores. These are aggregate scores for the test cohort and align directly with the learning outcomes. Institutional score will be compared to average of all U.S. institutions using the test. According to the assessment indicator scores, we will identify the deficiency of our students in the learning outcomes, and will initiate discussions within four area committees (General Biology, Ecology and Biodiversity, Microbial & Cellular Biology and Zoology) for curriculum review. Each area committee will propose suggestion on curriculum revision to the biology faculty in a faculty meeting. The core requirements of B.S. in Biology will be also reviewed and the curriculum revision will also be proposed.

(2) Biology department will administer Scientific Literacy, which intends to evaluate students' analytical skills, interpreting data and critiquing experiment design skills, and reading and interpreting graphical representation skills.

(3) Department will implement an exit interview for senior students. To achieve that goal, an online exit interview survey will be created.

AY2016

The curriculum mapping exercises and the inclusion of student learning outcomes in syllabi will be a key part of our assessment work for the upcoming year. The Biology BSE program assessments are transitioning due to changes at the state level with the KSDE reporting requirements, so this assessment work is being done as well. It is anticipated that the curriculum mapping will help in identifying where assessment efforts should be directed. In addition, faculty focus groups have been scoring student works on a common rubric to determine whether or not students are effectively meeting program learning outcomes.

AY2015

Department of Biological Sciences will administer the Major Fields Test in GB 481 Senior Experience. Institutional “Total Score” and “Subscores” means will be compared to national average of institutions using the test.

We will also obtain Major Fields Test “assessment indicator” scores. These are aggregate scores for the test cohort and align directly with the learning outcomes. Institutional score will be compared to average of all U.S. institutions using the test.

Start: 7/1/2015
End: 6/30/2025

Survey - Data Collection Links
While in View Tab, click the link below to access the Meta Rubric:

Assessment Best Practices Meta Rubric Link

Link to Individual Course Assessment Tool

Department Level Key Strategies and Adaptations and Next Steps
AY2017

According to the assessment indicator scores of the Major Field Test, we will identify the deficiencies of our students in the learning outcomes, and will initiate discussions within four area committees (General Biology, Ecology and Biodiversity, Microbial&Cellular Biology and Zoology) for the possible curriculum review. Each area committee will propose suggestions on curriculum revision to the biology faculty in a faculty meeting. The core requirements of B.S. in Biology will be also reviewed and the curriculum revision will also be proposed.

AY2016

The curriculum mapping exercises provided some key findings to focus future assessment efforts including working on the coordination of graduate faculty in advising, mentoring, and assessing the two separate degree tracks. It was determined that a good many of the students were pursuing the MA degree instead of the MS degree, which created a big differential in the mentoring requirements for faculty. The chair is proposing a combining of the two degrees (MA and MS) into one master of science degree with two degree track options. The findings for the faculty focus groups is described and evidenced in the Biology MS/MA section.

AY2015

The ETS Major Field Test will produce an "assessment indicator", which is a further breakdown of our institutional scores on the MFT compared to national benchmarks. This data is only reported as an aggregate institutional score. The MFT will be able to help us identify students' deficiencies in sub-areas. In response to this assessment we will conduct a survey of the biology faculty who teach “core” classes to ascertain the degree of coverage of these topics. It is hoped that next year's curriculum mapping exercises will lead to alignment for these sub-areas within the overall curriculum.
Program Name: Biology BS/BA

Summary of Program Assessments
AY2016

Student learning outcomes will be assessed by administering the Major Fields Test in GB 481 Senior Experience. Institutional “Total Score” and “Subscores” means will be compared to national average of institutions using the test.

We will also obtain Major Fields Test “assessment indicator” scores. These are aggregate scores for the test cohort and align directly with the learning outcomes. Institutional score will be compared to average of all U.S. institutions using the test. The learning outcomes of Department of Biological Sciences are:

I. Graduates with a B.S. degree in biology from ESU have a broad and solid foundation of biological knowledge. Specifically they can demonstrate this knowledge in the areas of:

   A. Biochemistry and energetics
   B. Cell structure, Organization and Function
   C. Molecular Biology and Molecular Genetics
   D. Organismal Diversity
   E. Zoology
   F. Botany
   G. Population Genetics and Evolution
   H. Ecology

II. Graduates with a B.S. degree in biology from ESU understand and are skilled in the processes of biological research.

   A. (Experimental)
      i. They can formulate testable hypotheses that distinguish between a number of plausible alternative explanations.
      ii. They can design experiments that will generate reliable evidence that is relevant to a hypothesis.

   B. (Analytical) They are able to read, create and interpret graphs of scientific data

   C. (Statistical) They are able to explain the results of inferential statistical tests.

   D. (Technical) They are confident in the use of instruments commonly used in biological research.(i.e spreadsheet programs, pipettes, microscopes)

   E. (Communication) Students can summarize and explain biological research (their own or of others) in a clear, reasonable and logical manner through written or verbal means.
Program Name: Biology BSE

Summary of Program Assessments
AY2016

A key biology faculty member who has taught in the Bachelor of Science in Biology program for many years recently proposed to terminate the BSE program. The faculty will discuss and vote for whether the BSE will be terminated or not in fall semester of 2016. Currently, the KSDE report for the program has no completers, thus no data files to upload or findings to update for this area. The curriculum map for the BSE is included in the mapping for the three programs BA/BS/BSE as all three share common courses in their respective curricula.

Curriculum Map
Reports and Other Evidence Documents

Program Name: Biology MS/MA

Summary of Program Assessments
AY2016

At the end of the spring 2015 semester, each faculty was given a survey to quantitatively assess the three learning outcomes of the Master of Science and Master of Arts programs. Biology faculty ranked student performance/competency/skills in regards to the learning outcomes using scale of 1-5: (1) poor, (2) fair, (3) good, (4) very good and (5) excellent;

The learning outcomes of M.S. program are:

(1) Students demonstrate in-depth knowledge of facts and concepts in a concentration area of biology.

(2) Students demonstrate aptitude in research design, data collection, data analysis, and reporting findings of scientific research.

(3) Students are able to critically read primary literature, effectively communicate scientific research through writing and speaking.

In the survey, the learning outcome (3) is divided into three sub-objectives. Biology faculty gave high ratings for the learning outcomes of our M.S. program. All the faculty members rated "good", "very good" or "excellent to all the five learning objectives except one learning outcome "Students are able to critically read primary literature", for which only one faculty member rated it "poor".

The learning outcomes of M.A. program are:

(1) Students demonstrate in-depth knowledge of facts and concepts in a concentration area of biology.

(2) Students are able to explain applications of research methodologies and analyses relevant to the student’s concentration area.

(3) Students are able to critically read primary literature, effectively communicate scientific knowledge through writing and speaking.

In the survey, the learning outcome (3) is divided into three sub-objectives.

Biology faculty expressed more concerns on M.A. program. For the learning outcome (1), 27.3% of faculty rated "poor" or "fair", and only one faculty member rated "very good" and no faculty rated "excellent". For the learning
outcome (2), 36.4% of faculty members did not satisfy M.A. students' ability to explain applications of research methodologies and analyses. In addition, 27.3% of faculty members rated "effectively communicate the scientific knowledge through speaking" as "fair". However, most faculty members were pleased with students' ability of critically reading primary literature and effectively communicating the scientific knowledge through writing" (rated "good" or better).

These findings have informed the faculty of the areas of strength and improvement for both of these degrees. In the upcoming year, this information will lead assessment efforts in improving student learning in those courses contributing to areas of need.

Curriculum Map

Reports and Other Evidence Documents

Faculty focus group_rating of learning outcomes of graduate programs

Faculty focus group_ratings of learning outcomes of graduate programs

Progress: Ongoing over Multiple Years

Feedback on Assessments

Academic Year 2016

The assessment plan for the Biological Sciences department shows incremental improvement over the past two years. The curriculum mapping exercise enabled faculty to collaborate and discuss the curriculum alignment across courses for each of the specific degrees. The faculty also did some good focus group work to assess the quality of the master students' skills in meeting program level learning goals. Using this rubric and scoring student masters thesis works was a great way to see exactly where to focus future assessment and student learning improvement efforts. The data was informative in that it showed the areas where students were performing at a high level (writing about scientific knowledge) and also identified areas (developing verbal communication skills in presenting scientific research; research methodologies and analyses) for improvement in the Master of Arts program. Overall, the main impetus for the program level assessments is to develop more capacity, that is more faculty contributing to assessment of their courses across the board. The contributions that the department makes toward general education courses will be included in the general education assessment program which is undergoing some intentional revision to enhance student learning. The Biological Sciences department plays a key role in providing students' general education in the sciences. It is anticipated that department faculty will be contributing to these assessment efforts as well. I'll look forward to working with you in the upcoming months to provide assist in assessment design efforts for both programs and the general education curriculum in the department. Hang in there and keep encouraging faculty to contribute to assessment efforts!

Academic Year 2015

The assessment plan for the Biological Sciences department is a work in progress and including the KSDE report and associated files will bring a more concise picture of the overall assessment of the undergraduate programs as the BA/BS/BSE curricula are very closely aligned. Heading into the 2016 Academic Year with a detailed plan will be beneficial. Change in department chair leadership and the course load assignments left little time to dedicate towards defining and refining the departments assessment plan. A general biology lab course assignment was assessed as a part of a group effort in measuring students critical thinking skills. I have attached the results of this general education assessment and it can be reviewed to provide information to improve student learning of critical thinking skills. In addition, three Biology faculty members served as raters for the assessment project. These efforts and expertise are greatly appreciated. Going forward there are opportunities for faculty to focus student learning improvement strategies at the course level. It will be beneficial to share the changes made by using assessment results to inform both curriculum and pedagogy changes for improving student learning.
Providing Department: Biological Sciences
Responsible Roles: Associate Professor (Simons, Kim), Department Chair (Yang, Yixin Eric), Associate Professor (Burnett, Tim), Associate Dean (Brewer, Joan)