ANNUAL ASSESSMENT REPORT
Academic Year: 2016/17
Department: Earth Sciences
Undergraduate Program

Following our 2012/13 departmental Assessment Plan, we have followed the Year 4, guidelines for course assessment. The designated courses include: Vertebrate Paleontology, Global Tectonics, Snow Dynamics, Environmental Geology, and Advanced Regional Geography. These courses represent our identified themes of Earth History, Earth Composition and Architecture, Earth's Surficial Processes, and Human Dimensions of Living on Earth. The Student Learning Outcomes for these courses also represent the mastery of concepts and discipline-specific skill.

On May 5th, 2017, the departmental faculty met and discussed the teaching and outcomes for the designated courses. Faculty from each of these courses gave a presentation to the group and discussed the following questions: 1) What were the student learning outcomes(SLO's) for your course?; 2) What are some instructional activities that address these SLO's?; 3) What are the metrics or evidence that students are achieving these goals?; and 4) What are lessons learned that will help you to modify your course to improve student learning? These presentations were followed by faculty discussion and suggestions. Results of the assessments are below.

1. GEO 411 Vertebrate Paleontology, taught by Dr. David Varricchio. Pre-requisites: GEO 211 (Earth History and Evolution) and BIOB 170 (Principles of Biological Diversity)

   A. Student Learning Outcomes:
      a. Learning the taxonomy, anatomy, paleoecology, and phylogenetic relationships of the major groups of fossil vertebrates.
      b. Understanding the overall pattern of vertebrate evolution sufficiently to be able to generate macroevolutionary questions.
      c. Developing observational skills such as note taking and illustration for the examination of vertebrate fossils.
      d. Improving identification skills of fossil vertebrates.

   B. Examples of instructional activities:
      a. Lectures and Reading, Paper presentation to summarize and report to class on a current journal article that was assigned.
      b. Lab exercises – students keep a notebook in which they make sketches and answer questions.

   C. Metrics or evidence of goal achievement:
      a. 2 exams
      b. Paper presentation
      c. Notebook quality
      d. 2 lab exams

D. Lessons learned:

    a. In order to improve students' grasp of the readings, next year's course will require that students answer a set of questions for each reading. Students will also be asked to develop their own sets of questions to ask the class.

    b. In order to improve the students' ability to identify specimans, next year's students will be given random specimans each class period for further guided practice.

2. GEO433 Global Tectonics, taught by Dr. David Lageson.

    A. Student Learning Outcomes:

        a. Developing an understanding of the history and development of the modern Plate Tectonic theory.

        b. Learning the geological features associated with the three major plate boundary types.

        c. Learning early earth history, tectonics of the Western US, and planetary tectonics.

    B. Examples of instructional activities:

        a. Lectures

        b. Homework activities related to geologic and geophysical data sets

        c. Quizzes

        d. Field trip

    C. Metrics or evidence of goal achievement:

        a. 2 midterm exams

        b. 1 final exams

        c. Homework and quizzes

    D. Lessons learned:

        a. There is a need to update material every year to keep current with this dynamic field.

        b. Students can learn tectonic concepts through focused class curriculum or focused plate tectonic setting.

3. ERTH 450, Snow Dynamics, taught by Dr. Jordy Hendrikx

    A. Student Learning Outcomes:

        a. Gain an understanding of the critical role snow plays in natural systems with a focus on hazards.

        b. Understand how the physical and thermal properties of snow arise through a combination of weather and metamorphic processes.

        c. Be able to describe the major causes of spatial and temporal variability in snowpack properties.

        d. Be able to analyze and interpret snow cover data.

e. Know where to find relevant snow information and be able to critically evaluate scientific papers related to snow.

f. Be able to dig a snow pit and interpret the layers in terms of processes and implications.

B. Examples of instructional activities:

a. Weekly lab exercises that build on understanding and ability to describe and interpret –cumulative approach: snow layer hardness and density, crystal form, and full snow profile.

b. Mid-term and final exams

c. Term paper and presentations

C. Metrics or evidence of goal achievement:

a. Weekly lab scores

b. Test scores

c. Term projects and presentations

d. In-field progression with observations, descriptions, and interpretations

D. Lessons learned:

a. Need to focus first few labs on basic skills to enable the addition of complex tasks later.

b. Continue to seek diverse student enrollment

c. Consider adding a pre-requisite of a "level 1 avalanche course"

d. Continue to emphasize safety

4. GEO 103 Environmental Geology, taught by Dr. David Mogk

A. Student Learning Outcomes:

a. To demonstrate the relationships between humanity and the Earth system – impacts of humanity on Earth, and ways in which our society is impacted

b. To develop " scientific habits of the mind" through observation, acquisistion and application of evidence, modeling and experimentation.

c. To develop life-long learning skills – communication, quantification, information, and collaborative learning skills.

d. To develop informed readers of newspaper, consumers, voters.

B. Examples of instructional activities:

a. Lab activities including topical debates, hazards, stream table, environmental health.

b. Lecture activities including, "buying a home", reflective writing, book reviews, think-pair-share

c. Service learning

C. Metrics or evidence of goal achievement:

a. Grading by contract: students choose from the activities above which ones they would like to use.

b. Short answer mid-term and final exams

D. Lessons learned:

a. Service learning is time consuming and requires additional resources not currently available.

b. May need to adjust the balance of activity types to ensure all learning objectives are met.

5. GPHY 445 Advanced Regional Geography, taught by Dr. Julia Haggerty

   A. Student Learning Outcomes:

   a. To identify key drivers of growth and change in the contemporary American West.

   b. To relate these global and regional trends to current issues in the different parts of the American West.

   c. To energize and train students to apply this knowledge productively in their future careers.

   B. Examples of instructional activities:

   a. Readings

   b. Lectures and guest lectures

   c. Most of course is project based.

   d. Take-home mid term exam

   C. Metrics or evidence of goal achievement:

   a. Public presentation of project results

   b. Exam scores

   D. Lessons learned:

   a. Group dynamics are important and intervention sometimes necessary.

   b. Use of role play is effective in presentations.