

## MEMORANDUM

**DATE:** 19 February 2010  
**TO:** Liz Dolci  
**FROM:** Leslie Kanat  
**SUBJECT:** Assessment for Integrated Environmental Science major, B.S. ENV-IES

Development of the assessment measures is a continuous process that will inevitably force us to modify the learning outcomes and develop additional learning experiences and changes in the curriculum as we analyze the results of the assessment protocols.

### **1) Have formal learning outcomes been developed?**

Formal learning outcomes were approved by the Department of Environmental and Health Sciences in March 2005 and are listed below.

The B.S. in the Integrated Environmental Science seeks to produce graduates who:

- critically read, evaluate, and synthesize information from relevant geological, biological, and chemical literature related to environmental problems;
- work individually, and with others, to identify and evaluate environmental problems;
- apply appropriate tools, analytical equipment, and concepts from mathematics, physics, chemistry, geology, and biology, including the use of computer software, to evaluate environmental problems;
- observe and measure in the field and laboratory, the organic, inorganic, and physical aspects of environmental problems while applying the methods of science;
- design a research project to test hypotheses and draw conclusions based on knowledge of the sciences; and
- articulate, in oral, written, and graphical form (using computers), assessments of environmental problems, and
- work effectively both individually and as part of a team.

### **2) Where are these learning outcomes published?**

The learning outcomes are published in the following places:

- a) JSC Undergraduate Catalogue (published annually).
- b) On the Department of Environmental and Health Science's college web site at <http://www.jsc.edu/Academics/EnvironmentalAndHealthSciences/EnvironmentalScience.aspx>.
- c) Selected learning outcomes are included in appropriate course syllabi.

### **3) Other than GPA, what data and evidence are used to determine that graduates have achieved the stated outcomes for the degree?**

The following direct and indirect mechanisms are used to determine if the students in our major are meeting the objectives:

- a) Speakers invited to present in the Current Topics in Environmental Science Seminar Series are asked to complete a questionnaire that addresses the level of student engagement, the quality of the student questions asked of the speaker, and general perceptions of the student audience.
- b) Experts in appropriate fields are invited to attend the JSC Extended Classroom Experience Day where students present their work (usually as a poster session). The experts are asked to critique student presentations.
- c) All students must take the college-wide Writing Proficiency Exam. The students in this major pass this exam well above the college average passing rate and only lag behind those who major in English or Creative Writing.
- d) The department tracks the length of time it takes the student to complete their Senior Thesis. Many of our students do not complete their theses on time (and as specified in the senior thesis contract).
- e) Feedback from corporations that have hired our graduates provides insight into their skill set, maturity, and readiness. We need to develop a more formal survey, yet we know that the same corporations tend to hire many of our students thus suggesting that our graduates are appropriately trained.
- f) Students that hold internship positions are evaluated by their employer. We need to develop a more quantitative analysis of the internship evaluations.
- g) The data collection procedures, for the placement rate of our students that seek advanced degrees or enter the workforce, need a better tracking mechanism.
- h) The student retention rate should be tracked (and compared to other majors) as an informal indication of the strength of the program.

### **4) Who interprets the evidence? What is the process?**

The aggregated data and evidence for success of the program is initially reviewed by Drs. Bacchus and Kanat (the two individuals who advise most of the students in the program and teach most of the classes in the program). Their initial analysis is then presented for further discussion at an appropriate meeting of all faculty in the Department of Environmental and Health Sciences. If significant programmatic changes are indicated, then the analysis would be reviewed by the JSC Curriculum Committee. Over time, we will rely more and more on the assessment process to make informed changes in the curriculum.

### **5) What changes have been made as a result of using the data and evidence?**

The following changes to the program have been made:

- a) The importance of learning appropriate writing skills is maintained.
- b) The speakers who are invited to make presentations to the students in the Current Topics in Environmental Science Seminar Series are strongly encouraged to provide quantitative and scientific information (rather than policy and management positions).
- c) More courses in the major have been, and are being, modified in order to be categorized as quantitatively enhanced.
- d) Students are being advised to take more chemistry and mathematics courses than currently required in the major.
- e) Students are being asked to use more technology in their research, laboratory work, class work, and for use in presentations.
- f) Most of the classrooms in the Bentley Science Building are now technology enhanced.

- g) We must redesign the process for completion of the Senior Thesis. Students are not completing their theses on time and thus delaying their date of graduation.
- h) More effort has been focused on acquiring funds to purchase equipment and use more technology for teaching and learning.
- i) The Bentley Science Building is currently undergoing renovation; the renovations include more office space, more laboratory space (for both students and faculty), and more space for meetings and gatherings. The renovated building will attract and retain more students.
- j) Student research and activities are based on relevant, important, local, enduring, and timely issues. Students must complete authentic tasks, and in doing so, recognize that their reports and results will have impact on the community. An example of this is the use of data from the department's Watershed Research Project. Involvement in this project has many of the characteristics of exemplary assessment tasks as described by Huba and Freed (2000): valid, coherent, authentic, rigorous, engaging, challenging, respectful, and responsive.
- k) The department should undertake a rigorous review of class syllabi to ensure that appropriate learning objectives are clearly stated and properly addressed.

#### **6) Date of most recent program review.**

The Integrated Environmental Science major underwent a Policy 101 review on 19 July 2007. The recommendations by the Program Review Committee indicated the following [text in braces is the status of their recommendations]:

1. Develop a long-term plan for the acquisition, repair, and replacement of needed lab equipment [In addition to grants received, the department now has regular funding from the JSC administration for equipment acquisition, repair, and replacement].
2. Consider raising lab fees, which still sit at \$25, less than other VSC colleges [Laboratory fees were raised to \$40].
3. Develop comprehensive assessment strategies, tied more directly with the senior capstones required by both majors [Assessment of learning outcomes is an ongoing process that continues to improve].
4. Enrollment, retention and graduation data for the two majors need to be disaggregated and reported separately [Unfortunately, both majors are often reported as one].
5. Develop a formal survey for graduates (perhaps using Castleton's as a model) [JSC continues to improve its exit survey].
6. Consider substituting organic chemistry for two courses (Fundamentals of Soil Science and Hydrology) for which it is difficult to find part-time faculty [This recommendation is no longer valid because the department has found reliable, highly-qualified individuals to teach these courses on part-time basis].
7. Develop the proposed departmental collective research project [The department-wide Lamoille Watershed Research Project is well underway. We are proud to announce that numerous faculty and students are involved in a broad range of local research requiring fieldwork, laboratory work, library research, senior theses, independent studies, publications, and presentations].