

## **2004-2005 Annual Academic Assessment for Biology**

### **Schreiner University**

#### **1. The educational purpose of the program:**

Students majoring in one of the sciences should progress well beyond the science outcomes designated for all Schreiner University graduates. Such graduates should be leaders in helping other citizens become scientifically literate. In other words, a major in science should prepare students to communicate their scientific knowledge to others. In addition, science graduates should be prepared for advanced study in the natural sciences and for entry into the working world. Towards these ends, science major curricula at Schreiner University will emphasize communication skills and the kinds of skills and knowledge which enable students to be successful in graduate school, in postgraduate professional schools, and in the workplace.

## 2. Educational goals, assessment of each goal, performance standards, and findings:

### Goal # 1 : Design and perform experiments.

Students have reached this goal when they pass their capstone experience with a passing grade (course is pass/fail) and when their overall GPA is 2.0 or higher. Upon failing to reach these levels, they are asked to retake the capstone course or to retake courses in order to raise their GPA

1998-1999 Capstone pass rate: 100% GPAs: 2.74-4.00

1999-2000 Capstone pass rate: 100% GPAs: 2.74-3.74

2000-2001 Capstone pass rate: 100% GPAs: 2.31

2001-2002 Capstone pass rate: 100% GPAs: 2.00-4.00

2003-2004 Capstone pass rate: 100% GPAs: 3.54, 3.95

2004-2005 Capstone pass rate: 100% GPAs: 2.11-3.24

*Curriculum:* Assessment of this goal in the capstone courses and by their overall grade point averages indicates that students have been successful in reaching this goal. No changes are planned at this time

*Faculty Development:* Faculty will be encouraged to seek projects that appear in the literature and attend workshops where appropriate.

*Out-of-class experience:* Give students the opportunity to visit working biology laboratories where research is being done. More outside speakers active in research are being brought on to campus. The Harry Crate lecture series in 2005-2006 will focus on research accomplishments of Schreiner graduates.

### Goal # 2 Analyze the current research literature and use it to communicate effectively in written scientific research papers and oral presentations.

The final paper in Biology 3350 is designed to require biology majors to analyze the current research literature and to write a research paper. A “B” or better on this paper signifies satisfactory achievement of this goal. Biology 3350 (Writing and Research) is also designed to enable biology majors to learn to give well-organized oral presentations. Their second oral presentation in this course is the best indicator that they have achieved proficiency at this skill (“C” or better)

1999-2000 Final paper: 88%, Oral presentation: 88%

2000-2001 Final paper: 82%, Oral presentation: 82%

2001-2002 Final paper: 100%, Oral presentation: 94%

2002-2003 Final paper: 70%, Oral presentation: 100%

2003-2004 Final paper: 75%, Oral presentation: 91%

2004-2005 Final paper : 95%, Oral presentation: 100%

*Curriculum:* Assessment of this goal in Biology 3350 (Writing and Research) indicates that students have been successful in reaching this goal. An earlier writing assignment for Biology

3350 implemented in the fall of 2000 appears to be successful. Other writing assignments have also been added to the curriculum in various courses.

*Faculty Development:* Faculty are encouraged to keep-up with current literature in their research field of interest. Faculty members are also encouraged to participate in research in their field of interest.

*Out-of-class experience:* Students are introduced to practicing scientists. A specific lecture series to bring research scientists to campus was successfully implemented in 2003-2004 (the Harry Crate lecture series), and has been continued in the future. Usually at least one student per year presents a paper at a scientific meeting.

**Goal # 3 : Perform statistical analyses of data and effectively manipulate scientific computer software.**

A statistics exam is regularly administered during Biology 3350 (Writing and Research). This course is required of all biology majors. One of the purposes of this course is make sure that biology majors are able to perform statistical analyses of data, and to ensure that students are able to effectively manipulate computer software. Satisfactory performance on this exam (“C” or better) signifies accomplishment of the goal

1999-2000 63%  
2000-2001 100%  
2001-2002 88%  
2002-2003 60%  
2003-2004 82%  
2004-2005 90%

*Curriculum:* The statistical nature of laboratory data readily lends itself to analysis in all science classes. Projects are required of all students in each of these courses. Assessment indicates students are currently meeting this goal

*Faculty Development:* Faculty are encouraged to keep-up with the latest trends in software that is available for statistical analysis of laboratory data. A new computer lab is now available in the Moody Science building and the Scientific Spreadsheets class is now taught in this room

*Out-of-class experience:* Students are encouraged to use the statistical software packages that are available in the computer labs in the department and in the university

**Goal # 4: Demonstrate an open-minded, unprejudiced approach to problem-solving.**

The capstone course requires students to use an open-minded approach to problem-solving. Satisfactory completion of the capstone course (“C” or better) therefore illustrates an ability to perform satisfactorily in this area

1999-2000 100%  
2000-2001 100%  
2001-2002 100%  
2002-2003 100%  
2003-2004 100%  
2004-2005 100%

*Curriculum:* Assessment of this goal in Biology 3350 (Writing and Research) indicates that students have been successful in reaching this goal. Students must demonstrate adequate knowledge of the scientific method and can use this to design research projects

*Faculty Development:* Faculty are encouraged to keep-up with current literature in their research field of interest. Faculty are also encouraged to participate in research in their field of interest.

*Out-of-class experience:* Students are introduced to practicing scientists. A specific lecture series to bring research scientists to campus was implemented in 2003-2004.

**Goal # 5: Exhibit a working knowledge of major biological concepts.**

A grade point average of biology graduates of 2.0 or better shows a working knowledge of major biological concepts. The major field exam of biology graduating seniors also shows proficiency.

1999-2000 GPA 2.74-3.74; Field Exam score: 141 (national avg:154.7)  
2000-2001 GPA 2.31; Field Exam avg: 140.5 (national avg: 154.4)  
2001-2002 GPA 2.00-4.00; Field Exam score avg: 151.67 (national avg: 154.4)  
2002-2003 GPA 3.54, 3.95 ; Field Exam score avg: 152.5 (national avg: 154.3)  
2003-2004 GPA 2.09-4.0, avg: 3.22; Field Exam score range 132-153, avg: 145.8 (national avg. 146)  
2004-2005 GPA 2.11-3.24, avg: 2.62 ; Field Exam score range 133-145, avg. 140.0 (national avg: 154.2)

*Curriculum:* Measurement of this goal by overall grade point average and performance on an outcomes exam indicates that students fall into the lower end of national normative data.

*Faculty Development:* Faculty are encouraged to help the students understand the interrelationships of scientific concepts to other scientific concepts and to the world in general.

*Out-of-class experience:* Students are encouraged to interact with other students both science majors and non-science majors in order to discuss issues that affect their own field of study and all others

**Goal # 6 : Understand the interrelationships of scientific concepts, and understand that while scientific knowledge has limitations it also has great power to explain natural phenomena and solve problems.**

Understanding the interrelationships of scientific concepts is assessed by the biology outcomes assessment test and by the overall grade point average of biology majors. The limitations and power of science to explain natural phenomena and solve problems is assessed during the capstone course in which students get to struggle with the utility of scientific knowledge.

1999-2000 GPA 2.74-3.74; Field Exam score: 141 (national avg:154.7)  
2000-2001 GPA 2.31; Field Exam avg: 140.5 (national avg: 154.4)  
2001-2002 GPA 2.00-4.00; Field Exam score avg: 151.67 (national avg: 154.4)  
2002-2003 GPA 3.54, 3.95 ; Field Exam score avg: 152.5 (national avg: 154.3)  
2003-2004 GPA 2.09-4.0, avg: 3.22; Field Exam score range 132-153, avg: 145.8 (national avg. 154)  
2004-2005 GPA 2.11-3.24, avg: 2.62 ; Field Exam score range 133-145, avg. 140.0 (national avg: 154.2)

*Curriculum:* Measurement of this goal by overall grade point average and performance on an outcomes exam indicates that students come very close to national normative data, with one exception.

*Faculty Development:* Faculty are encouraged to help the students understand the interrelationships of scientific concepts to other scientific concepts and to the world in general.

*Out-of-class experience:* Students are encouraged to interact with other students both science majors and non-science majors in order to discuss issues that affect their own field of study and all others