

# **Biology Department 5<sup>th</sup> Year Program Review**

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## ***1. The Department's Mission Goals Support the University's Mission***

The most important Biology Department mission is to provide students with the very highest quality of biology education in both undergraduate and graduate programs. The Biology Department strives to maintain the highest standards in teaching and student learning, continuous assessment of progress of teaching and learning from the perspective of the student, faculty, and programs.

Our mission goals are:

- 1) provide high quality undergraduate and graduate biology science education to our biology majors
- 2) provide high quality service courses to SCSU students in Nursing and Allied Health Majors
- 3) provide high quality introductory science courses for non-majors fulfilling the science component of their general education requirement
- 4) contribute to the liberal education programs of study espoused by the university.

### **Compliance with University Mission Goals**

University mission goals are stated, detailed, and discussed in the SCSU publication *"Pursuing Excellence, Fostering Leadership, Empowering Communities. A Strategic Plan for Southern Connecticut State University 2007-2012."* SCSU core values include Excellence, Access, Diversity, Student Success, Life-long Learning, and Community Involvement and they are part of our Biology Department vision

### **Vision Statement.**

#### **Core Values.**

Core values represent the basic expression of SCSU ideals and the concept that these ideals arise from shared governance of administrators and faculty. Biology faculty are intimately involved in the formulation and implementation of core values at the university, department and individual level in several ways.

**Excellence.** Biology faculty strives to instill the core value of excellence in their students by example and by teaching and learning content.

**Access.** Biology Department faculty and programs of study focus entirely on the science of biology. Biology is open and accessible to all. Biology department continually

maintains this accessibility via (a) offering three different degrees, (b) provision for students taking a minor in biology, (c) a graduate program of study that offers three degree possibilities, (d) different concentrations of biology study (e) opportunities to work with one or more biology faculty in undergraduate and graduate research

**Diversity.** Diversity can refer to varied student body majoring in biology and varied biology faculty as well as diverse learning experiences proscribed by the Biology Department. The Biology Department faculty is diverse and has diverse teaching, learning and research interests, all of which maximize opportunities for biology students.

**Student Success.** Student success is the ultimate goal of the biology department faculty, its courses, and its programs. Student success occurs and is measured on a daily basis, course-by-course basis, program basis, and their success at the culmination of their SCSU career. All biology courses use a variety of instruction methods and assessment to account for and provide for different student learning abilities and modes.

**Life-long Learning.** Biology Department believes that the key to developing and instilling attitudes of life-long learning in our students is several folds. **First**, provide biology students with a firm grounding and background in scientific facts, scientific literature and most of all, scientific methods. **Second**, the conveyance of knowledge must necessarily be a component of all meaningful scientific learning in biology. **Third**, provide our graduating students with the ability to verify observations and reports with the wealth of biology scientific literature previously reported.

**Community Involvement.** Much of the community involvement of Biology Department professors stems from their teaching and research activities.

## **Biology Department Goals and the Overarching Goals and Strategic Initiatives of the University**

The overarching goals of SCSU mission are:

- A. Strengthen undergraduate and graduate academic programs by fostering an institutional climate of excellence in teaching, scholarship, and creative activity
- B. Become a regional leader in the use of technology to support student learning,
- C. Develop an effective plan for student success
- D. Foster a campus climate that respects and celebrates diversity
- E. Increase funding from external sources to support the university's mission
- F. Develop an effective information management system to inform decision-making in all areas of the University,
- G. Strengthen organizational structures and operations to improve institutional effectiveness and communication
- H. Ensure a campus that is environmentally responsible, safe, attractive, and conducive to learning and high levels of productivity

## ***2. The Department has Clearly Stated Program Goals and Objectives.***

**High Quality Biology Education for Biology Majors.** The primary thrust of our department remains focused on providing the very highest quality of biology education for students majoring in biology at the undergraduate and graduate levels. Accomplishment of these goals can be described and measured as per their expected outcomes:

### **Basic Statement of Goals and Expected Outcomes**

1. Students must be able to clearly demonstrate a mastery of the subject of biology.
2. Students must be able to demonstrate mastery of the scientific method, including using the scientific method and scientific literacy
3. Students must be able to demonstrate appropriate laboratory techniques and mastery of basic laboratory skills in pursuing a biology problem
4. Students must be able to demonstrate mastery of the importance of and contributions of biology history to both the historical component and modern applications as per fields.
5. Students must demonstrate mastery of the art of critical thinking, associated cognitive skills in the formulation of a problem, data gathering, analysis
6. Students must demonstrate a clear understanding of the issues and involvement of biology in modern society.

### **High Quality Service Courses for Nursing and Allied Health students.**

The Biology Department offers a series of service courses for Nursing students including Bio. 110 Human Biology I, Bio. 111, Human Biology II and Bio.120 Basic Microbiology. Successful completion of these courses is required to enter the Nursing program and is expected in their Health and Allied Sciences.

### **High Quality Service Courses For General Education Students**

The third fundamental academic goal of the Biology Department towards excellence in teaching and learning is to provide the highest quality introduction courses for general education students as part of their GenEd requirements. The Biology Department offers three courses specifically designed for these students including Bio. 100 Zoology, Bio. 101 Botany and Bio. 104 Biology.

### **Essential goals and student learning outcomes for students majoring in biology.**

1. An essential student-learning outcome identified by Biology Department is to ensure high quality overall university-level introduction to the science of biology, to follow the logical constructs of biological information.

2. An essential student-learning outcome is to ensure a basic but complete introduction to fundamental workings of biology as a science with respect to verbal, written, quantitative, and qualitative science learning. Biology science learning involves developing science vocabulary skills that enable understanding of laboratory procedures and processes, lecture and textbook materials and the ability to access library and on-line resources.

### **Additional Documentation and Components of Item 2**

**Aligning library resources to meet department needs:** Because of the continuous changing nature of biology the biology department faculty constantly needs updating of library facilities for both faculty and students, including books, journals, and online resources to enhance teaching and learning of both undergraduate and graduate course offerings of specific courses and specific fields.

**Improving services for students.** The Biology Department is currently reviewing methods to improve and speed communications between students and faculty for teaching and learning of biology. We are (1) establishing and enhancing advisor-student relationships throughout the year (2) promoting inter-collegiality amongst students, faculty, and outside visitors (3) providing seminar series to demonstrate activities of biology faculty, (4) providing opportunities for student involvement in faculty research.

**Enhancing professional development of biology faculty for students.** Continued professional development is also a cornerstone of the teaching and learning cycle. All of our faculty demonstrates their continuous professional development by (1) attending meetings of their professional societies (2) writing research papers for publication in their professional journals and (3) conducting research in their professional fields.

### ***3. The department /program has clearly stated program-level expected student outcomes and methods for measurement***

#### **Direct Assessment and Assessment tools for Biology Program**

The assessment of the Biology program will measure student-learning outcomes starting with the entry-level courses, assessing progress in their junior year and a final assessment in their senior year. This process will allow us to identify weaknesses prior to their last year at SCSU. With this information we will be better prepared to advise them and guide them in their last two semesters. The tools to be used range from the standard surveys provided by the University to specifically designed course evaluations to provide the department with quantitative data to improve both student and teacher performance.

### **Program Assessment:**

All of our biology courses use the standard course evaluation sheets provided by the university, and these are used to give us an idea about the progress students are making in the program. Our program assessment will be done in steps and at various levels of student progress in the program.

**First**, all students will complete a **BEGINNER BIOLOGY EVALUATION (BBE)** survey similar to AP Biology to determine their knowledge level of Biology during their first semester as Biology Majors in either Biology 102 (Zoology) or 103 (Botany). One hundred questions will be randomized from a question bank obtained from standard exams. The exam will include questions that cover the four concentration areas offered by biology

### **Advising based on BBE:**

This exam will provide the basic framework for biology advisors to guide the students through their years in the university. This issue is critical for all students and faculty in biology because a comprehensive experience of our students in Biology will depend on course offerings and course cancellations, particularly Upper-level courses that provide the in depth background for their success in their future career.

### **Fall Semester of Freshman Year:**

Beginning Biology Evaluation will be administered in either Biology 102 (Zoology) or Biology 103 (Botany).

### **Spring Semester of Junior Year:**

**Second**, all Biology Juniors will take an **EXIT BIOLOGY EVALUATION (EBE)** similar to the Biology subject GRE (Graduate Record Examination) or an ETS Major Field Exam (Student Testing Service) divided into the Four Concentration Areas offered by the Biology Department

- 1- Anatomy/Comparative Biology
- 2- Biodiversity/Ecology
- 3- Cell/Molecular Biology
- 4- Physiology

The overall score and of each section of this exam will be used to better advise students on the courses to take during their Senior Year to fill in any gap in their mastery of the Biological Sciences. Particularly, the scores of the individual areas of concentration will be analyzed to determine course selection in the senior year at SCSU needed before graduating.

## **SENIOR YEAR EXPERIENCE**

### **Fall or Spring Semester of Senior Year**

**Third**, all Biology majors will have the choice of three possible final evaluation plans:

#### **A- Capstone Course**

##### **Biology 499: Independent Study and Research**

The Biology Department offers a Course (Bio 499 - Independent Study and Research) in which students are be able to conduct a project to incorporate items **A to H** of the Biology Department Objectives. The project is based on mutual agreement with a faculty member who serves as mentor during the study. This course provides students a venue to apply and review their knowledge and skills acquired during their previous semesters. Furthermore, students demonstrate mastery of content, laboratory techniques, analytical, and writing skills. To register for this course a student must have completed 90 university credits and a GPA of 3.0.

#### **B- Capstone Experience**

##### **Biology 495: Departmental Honors**

This course is a more in depth study / research project taken by students with Biology GPA greater or equal to 3.0 for those who intend to earn departmental honors.

This course includes the completion of a research problem and reporting of the work in a senior thesis, which must be defended successfully before the department. (Bio 499 is recommended).

The success of these courses (A and B above) depends on the availability of upper-level elective courses that students can take during their studies at SCSU. Furthermore, these two courses will need to be offered every semester if they are to be a requirement for graduation when the students does choose plan C SYE. We expect that Seniors who graduate from our program meet our department goal.

#### **C- Senior Year Evaluation**

Students who choose this plan will take a version of Standard GRE (Graduate Record Examinations), MCAT (Medical Entrance Examination or DAT (Dental Admissions Exam). This evaluation will provide a measure to compare how our students compare to other students completing similar degrees. These exams cover basic biological concepts that are included in our areas of concentration.

## **Course Assessment**

Biology 101 and 103:

To better understand student-learning outcome, several courses are implementing assessment to incorporate student concerns and needs. One example of new trend in the Biology Department are Biology 101- General Botany and Biology 103- Botany in which student assessment is done at the beginning of the course (after two weeks of the start of classes) to determine any need for improvement or adjusting of pedagogical methods to benefit student learning and again at the end of the semester. A survey has been designed to quantify student-learning outcomes (APPENDIX II). This method follows the ideas of the SENCER Institute (Student Education for New Civic Engagement and Responsibilities) that promotes student engagement in the teaching and learning process. This assessment is also designed to compare learning aptitudes between majors and non-majors by giving them the same lecture material and the same laboratory exercises and experiments. For both courses the expectations remain the same: analytical aptitudes, quantitative analysis, writing-speaking skills, and laboratory skills.

## **INDIRECT ASSESSMENT**

Indirect assessment will be incorporated in the Biology Department as an integral part of our assessment of student success. Providing students with the tools to succeed in the job market or in professional schools requires us to train students in current scientific techniques and to have scientific journals and specialized literature available for their studies.

We will monitor the following items:

- a) inventory equipment and number of majors per instrument in laboratories
- b) class size limits
- c) number of discipline monographs in biology at Buley Library as provided by Librarians
- d) number and type of scientific journals and specialized publications at Buley Library
- e) space available to student for research and teaching
- f) retention of expertise by faculty by attending workshops, professional meetings and conferences related to biology

The biology depart will develop a system by which we can assess and track student success after leaving our program. To document student success, we will do the following

- 1- We will monitor our graduates by communicating with the alumni association and update our department database on student employment, career paths, and any accomplishments.
- 2- We will design our Departmental Web Page to allow for any alumnus updating their contact information and/or any information they would like to volunteer to let us know how their Biology degree prepared them to succeed in the workforce or professional schools.
- 3- We will survey alumni during Alumni Open House days organized by the Alumni Association.
- 4- We will design a survey for those students involved in Student Teaching as part of their Secondary Education Certification in Biology to determine their level of readiness for teaching jobs in elementary school

We believe that our Biology Program fulfills the goals of the University Mission by providing students with:

- a) Competencies in the Liberal Arts by providing them with tools and skills that go beyond the specialized nature of the Biological sciences
- b) Areas of knowledge and experience by helping them learn and comprehend all levels of the biological sciences, apply the scientific method, analyze and synthesized scientific information and to appreciate the importance of Biology to the society at large
- c) Discussions of values by engaging students in the discourse of the responsibilities of scientists and educated citizens to make good use of the information obtained through scientific inquiry.

We believe that the wealth of courses offered by the department gives students choices, yet the department is committed that our students complete their undergraduate education exposed to all levels of the Biological Sciences.

### **Documentation of Assessment**

The Assessment Coordinator will keep in the Biology Office all documents and assessment records for at least five years.