

UMBC'S DEPARTMENT OF BIOLOGICAL SCIENCES  
ACADEMIC PROGRAM REVIEW 2017  
UNDERGRADUATE COUNCIL REPORT

The following is based on the review of the portions of the Reviewers' Report, the Dean's Response, and the Post-APR Action Plan that relate to undergraduate education. At the time of the review in the Spring 2017, there were 22.5 tenured/tenure track faculty and 9 senior lecturers. The department serves approximately 1750 undergraduate majors annually, which the reviewers now is nearly three times the number of majors that there were 15 years ago.

A. STUDENT LEARNING OUTCOMES

The reviews did not summarize learning outcomes.

B. STATE OF THE DISCIPLINE; PROGRAM MODIFICATIONS; PROGRAM CHANGES

The reviewers praised the high quality of the undergraduate programs. They commended the innovative, team-based, and active learning techniques employed by the faculty. They saw the department's practice of having faculty from all ranks, including those with active research agendas, teaching large-enrollment classes as a strength of the program. They commended the department's use of assessments in making changes and improvements to the curriculum. They also noted that the diversity of the students and faculty and the positive atmosphere of the department as a strength and a draw to the program.

The reviewers' principal concerns centered on the low numbers of faculty (especially research faculty) compared to the number of students, the high advising loads carried by the faculty, and the quality of the facilities. They see these resources as insufficient to serve the increasing numbers of students interested in the Biological Science, saying "The resulting faculty to student ratio [1:86] is both dramatically out of line with other departments and insufficient to provide a high-quality educational and research environment."

Their recommendations for increasing the number of faculty, hiring professional advisors, updating labs and increasing lab fees were taken up in the responses from the Dean and the Action Plan. Going forward, the plan is to increase the number of tenure track faculty over the next 7-10 years, increase student lab fees and update the facilities, and take new approaches to advising undergraduates.

The reviewers also raised a question about whether the BA degree that was added in 2010 was adequately preparing those students for their intended careers. The recommended examining the outcomes for students in the BA and BS program to assess whether this program was having the learning outcomes the department and the students desired. This issue was recognized by the Dean, and the recommendation was incorporated into the Action Plan.

One remaining issue regarding the undergraduate program concerned the training of undergraduate and graduate TAs. This was something the reviewers raised and the Action Plan incorporated in the list of issues to investigate.

### C. UNDERGRADUATE CURRIULUM

The Department of Biological Sciences offers BA and BS degrees in Biological Sciences, a BS degree in Biochemistry jointly offered with the Department of Chemistry and Biochemistry, a BS in Bioinformatics and Computational Biology, a BA in Biology Education, as well as minors in Biological Sciences, Bioinformatics, and Quantitative Biology. In response to rapid increase in undergraduate majors in recent years, the BA degree was established, requiring fewer Biological Science courses. The department also reduces the number of required courses for both the BA and the BS and increased the number of students in their courses, with courses in the first two years carrying enrollments of 300 students.

### D. RESEARCH OPPORTUNITIES FOR UNDERGRADUATES

The reviewers saw this as an important part of the mission of the department and one that was suffering as a result of the low numbers of research faculty compared to the number of majors. As faculty have less time for research and the pursuit of grants to fund that research, along with reductions in funding for graduate students, there are fewer opportunities for undergraduates to be involved in research. They say, "The combination of the increase in student enrollment, the decrease of T/TT faculty, and the decrease in numbers of graduate students to serve as mentors has led to a paucity in the availability of positions for undergraduate researchers, which is a hallmark of Carnegie R1 and R2 universities." In addition to the calls for more faculty and improved laboratories, they note the department's plans to revive and increase course-based research experiences as a way to address this.

### E. UNDERGRADUATE ADVISEMENT

Each regular faculty member advises 50-60 students, according to the reviewers report. The reviewers saw this as a significant problem for both students and faculty, and recommended the hiring of professional advisors. The Dean's response and the Action Plan specified addressing this need by building on the Science and Math Advising Resource Team (SMART) resources.

### F. COUNCIL OF MAJORS; UNDERGRADUATE HONORS; AWARDS; RECOGNITION

The reviews did not address this issue.

## G. FACULTY DEVELOPMENT; TEACHING QUALITY

The reviewers were impressed with the faculty, particularly in light of the challenges of the large numbers of students and relatively few faculty to serve them. They noted the ways that faculty were responding to these challenges by adopting innovative, team-based, and active learning techniques. They praised the positive environment maintained by the faculty. They saw the department's practice of having faculty from all ranks, including those with active research agendas, teaching large-enrollment classes as a benefit for undergraduates.

## H. ADDITIONAL COMMENTS; SUMMARY EVALUATION

The external reviewers' and the Dean's reports agree that the Biological Sciences Department's undergraduate programs are doing excellent work with limited faculty, given the huge increase in students. The principal recommendation throughout these reports is to increase tenured/tenure track faculty. This would address challenges throughout the department, as the reviewers conclude, leading to "enhanced course offerings in the undergraduate and graduate curricula" and "increased capacity for undergraduate independent research opportunities."