

Department of Biochemistry and Molecular Biology

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Degree Program(s) Assessed	Assessment Methods	Number of Individuals Assessed
B.S. ¹	ACS standard examination	2
	Publications in refereed journals	67 ²
	Presentations at scientific meetings	67 ²
	Numbers of degrees	149 (over 10 yrs)
	10-year alumni placement	11
	Exit questionnaires/interviews	6
	External consultant	ca 30
	Enrollment	1421 (over 12 yrs)
M.S. and Ph.D.	Cumulative examinations	7
	Publications in refereed journals	23 ²
	Presentations at scientific meetings	23 ²
	10-year alumni placement	9
	Program Alumni Survey	10
	External consultant	35
	Time to degree	14

¹B. S. degrees in "Biochemistry", offered through the College of Arts and Sciences, and "Biochemistry & Molecular Biology", offered through the College of Agricultural Sciences and Natural Resources, are combined for this assessment report as "B. S. Biochemistry" since the programs differ in only minor respects.

²Number of graduates in past three years is given. What were assessed were publications or presentations from the department during the July 2000-June 2003 period.

Analysis and Findings

In the following the results of the analysis are given in regular font and the interpretations are in italics.

- **Standard examination:** This year, only two of the B.S. degree recipients took the examination. Graduating seniors have been asked to take an American Chemical Society examination in biochemistry, voluntarily. *Percentage participation has deteriorated to the point that the examination no longer provides an accurate picture of factual knowledge acquired by the graduating class.*
- **Publications in refereed journals:** Assessed were student authorships on refereed publications by department faculty members in the past three-year period. There were 27 publications in which 23 students were involved. Of these, 4 were B.S. program students, authors on 3 of the publications. First authorship by a student occurred on 12 of the 27 publications. *Since this is the first year that this particular measure has been made, the numbers established baselines for future comparisons. The small number of B.S. student authors should increase as we further emphasize the value of an undergraduate research experience. The number of publications per M.S. or Ph.D. student (slightly less than one) leaves much room for improvement.*
- **Scientific presentations:** Assessed were student listings on presentations at scientific meetings reported by department faculty members in the past three-year period. There were 36 presentations involving students (12 per year) in which 29 students were represented. Of these, 4 presentations included B.S. program students. A student was the actual presenter of two-thirds of the presentations. *Since this is the first year that this particular measure has been made, the numbers established baselines for future comparisons. The small number of B.S. student presentations should increase as we further emphasize the value of an undergraduate research experience. The number of presentations per M.S. or Ph.D. student (slightly less than one) leaves room for improvement.*
- **Number of degrees:** In the B.S. programs, the increase in the number of graduates that occurred in 1999 was sustained with 24 graduates in 2002-2003. Average for the past four years was 22, while

from 1993 to 1997 it was 7.5. The increase was concentrated in the CASNR degree program. *The CASNR degree program, in particular the premed/prevet option, is a popular one. Popularity may be an indicator of effectiveness.*

- **Alumni placement:** An attempt was made to determine the career status of individuals that obtained degrees in 1993. Personal knowledge of faculty advisors was supplemented by exploration of internet presence. Of 11 B.S. program graduates, 7 could be identified. Four of these were medical professionals, and the remaining 3 had in the past five years been in a profession that utilized their biochemistry training. Of 9 M.S. and Ph.D. program graduates, 5 were identified reliably. All had been professionally active in a field related to biochemistry during the past five years. *The majority of our graduates (not only of those successfully identified) have, 10 years after their graduation, occupations that indicate that they are using the knowledge and skills gained here and are continuing on a path of life-long learning.*
- **Exit questionnaires:** Only 6 graduating seniors elected to respond to exit questionnaires and undergo an exit interview. All respondents indicated that they had had adequate opportunities for reading scientific papers, and making oral and written presentations. Consistent comments regarded the inadequate quality of courses in two other departments, overall satisfaction with the BMB department and the students' degree program. The BIOC 4113 course was singled out as particularly valuable. Specific suggestions for improvement of the program were made. *The voluntary nature of this activity means that only really good students or students with complaints participate, making these a poor measure of educational effectiveness. Nevertheless, the overall impression is that the educational program is successful.*
- **External consultant:** An outside evaluator, Dr. [REDACTED] of the University of Nebraska, visited in November 2003 and reviewed both undergraduate and graduate programs. He spent two days attending lectures, talking with students and with faculty. His summary comments:

"My overall impression ... is that it is an active research and teaching program with highly qualified staff. The students, both graduate and undergraduate, are bright and enthusiastic. I was treated very cordially, yet I had no sense of pretense. The facilities are excellent, as evidenced by the Noble Research Center, where the design of the building helps to enhance interactions by the openness of the its corridors and glass walls to the office spaces. The overall feel is that it is a welcoming environment and open for personal interactions.

The most important memory I have of the visit is that the personnel with whom I visited were very welcoming and helpful. I believe this was a genuine feeling on their part and that there was no contrivance. The students were happy to talk freely and were very interested in biochemistry as a discipline, as well as their career paths in biochemistry. I was very favorably impressed with the Program."
- **Enrollment:** B.S. program enrollments for the past year (226) set an all-time record that was substantially above the 53 average for 1992-1996. Much of the increased enrollment is due to a premed/prevet option in the CASNR B.S. program. *The continued high levels of enrollment are taken as a sign that our degree program is successfully delivering an education of interest to many students.*
- **Cumulative examination progress:** The baseline value of an average of nine attempts to pass five examinations, established during the preceding period, has continued during the present period. *The absence of change can be attributed to consistent grading standards and a consistent educational program.*
- **2003 OSU Graduate Program Alumni Survey:** Only 3 individuals responded. All were M.S. graduates, were associated with an educational institution in positions highly related to their OSU graduate studies. They rated their OSU training about the same in quality as that of their current colleagues. *While the sample size is small, no obvious indications of problems were revealed. The general impression is that the education provided was consistent with that provided by other institutions.*
- **Time to degree:** Average time to degree for 10 M.S. students entering between 1999 and 2001 (three years) was 2.51 y, down from the three-year sliding averages of about 3 y for the past three years, returning to the level achieved by 1998-2000 entering students. For Ph.D. degrees awarded

to students who entered from 1997 to 2002, the average years to degree was 4.85, but this included 50% students entering the program with MS degrees. For the students entering with a bachelor's degree, the time was 6.0 years, significantly higher than previously reported for earlier periods.

Uses of Assessment Results

Assessment reports have been sent to faculty members in each of the preceding years. An earlier draft of this report, also, was sent to them for comment. The report has been adjusted to reflect their comments.

In 2004, the Department's Faculty spent about seven meetings of one to 3 hours duration at the end of May and beginning of June discussing the undergraduate curriculum. Assessment results that played particularly important roles in these discussions were:

1. Absence of value for our majors of some courses taught by other departments;
2. The high value of laboratory research experience for undergraduates;
3. The high value for developing problem solving skills of the BIOC 4113 course;
4. The popularity of the premed/prevet option.
5. The non-universal participation in exit exams, questionnaires and interviews, not giving us a complete picture of students' perceptions of their education.
6. Low utility of the ACS examination, the scores not showing any significant changes and the test not addressing what we would like the students to have learned.

Relative to result 1, the faculty decided that it would not ask that the courses be removed from the list of required courses, but rather that the advisors use discretion in approving requests to waive those courses as requirements. The problem with the courses (CHEM 2133 and 2122 and general physics) was thought to be the instructors rather than the subject matter.

Relative to result 2, the "freshman research scholars" course that has been run under the BIOC 4990 number, was deemed very useful and successful. It was decided to apply to make the course permanent under a number such as BIOC 1990 to correctly reflect its level. The first credit hour (the fall semester) is a laboratory-lecture class taken by many. Options for the second semester were discussed. A variety will be offered, including participation in ongoing research programs and independent group experimentation based on themes developed in the first semester. Students will be encouraged to take the second semester as well as the first by tying a small scholarship amount to the second semester.

Results 3 and 4 are related. For a variety of reasons, most students in the premed/prevet option do not take our most valuable course, BIOC 4113. It was decided to revise the degree requirements sheet to make it unambiguous that this course is a requirement for the degree, unless the student has been admitted to professional school before the student has had a chance to take the course. The advisors and the department head were encouraged not to allow waivers of this requirement except for rare unusual circumstances and to consult the course instructors in the process.

Result 5 was addressed as a result of the change decided on for BIOC 4113. Since 4113 will now be a course taken by practically all our majors, and the instructors are willing, we can have the instructors make participation in the exit interview/questionnaire process a requirement for a grade in the course. In addition an exit examination can be administered as part of the course. Because of result 6, the nature of this examination has not been decided. Options included continuation of the ACS exam; requirement to take a GRE in our field; producing a suitable exam ourselves.

The graduate curriculum will undergo a similar review within the next year. It is highly likely that assessment results will play a role in that review also. One topic for discussion will likely be the time taken to achieve the degrees.