Assessment Findings and Curricular Improvements
Department of Biology
Undergraduate Program

Assessment Measures

The Department of Biology uses the following measures to assess departmental learning outcomes:

- Performance on senior comprehensive exams
- Grades and enrollment totals for senior seminars
- Student Perception surveys

Assessment Findings

Senior Seminar Discussion *(Attachments 1 & 2)**:***
The Department of Biology analyzed course grades and enrollment data for BIOL 452 Senior Thesis Coordinating Seminar for a five-year period (Spring 2003 through Spring 2007) as well as selected data from the National Survey of Student Engagement (NSSE). The Department of Biology uses the NSSE to benchmark the general education outcomes of its senior students against senior students enrolled in: Catholic University, Carnegie Peers, and the entire NSSE participant group.

Because Biol 452 is a last semester senior course, a satisfactory grade of C- or better indicates a student's mastery of a variety of areas of biology in which they have been trained throughout multiple courses in our curriculum. To achieve a satisfactory grade, the students also need to have mastered the ability to make a professional oral presentation on complex scientific material, to answer wide-ranging and probing scientific questions, and to participate in a meaningful scientific discussion with their peers. During the period of data examination from this class, enrollment remained between nine and fourteen students. These students are divided into two sections to achieve a low student/faculty ratio and provide personal attention to the students. Each student presents two major seminars during the semester and has a faculty mentor in addition to the class instructor to guide them through the seminar process.

All but one student (58/59) who enrolled in the coordinating seminar displayed good to exceptional performance (B- to A+). The average grade in this course was 3.6 (B+/A-) over the five-year period with a range of 3.53 to 3.74 grade average per year during the data period. The course grade data support the conclusion that we are achieving our departmental goals for the undergraduate program as stated in the "Goals and Assessment of Student Outcomes" for Biology. This conclusion is reinforced by data provided by the National Survey of Student Engagement (NSSE). The survey of Spring 2007 graduates showed that students from our department are evaluating our curriculum with no statistical differences among Catholic University, the Carnegie Peers and the entire NSSE cohort. Therefore, the student's perception of what they are learning in areas of oral and written communication, critical reasoning and analysis, and ability to locate and use important information is within the average expectations of other departments and other universities. These areas of evaluation are all areas that are emphasized in our biology curriculum. The only area where the biology department had

statistically different results was in including diverse races, religions, gender, etc. in class discussion and assignments. This is consistent with the fact that our program is focused on conveying state of the art scientific information such as molecular and cell biology which does not necessarily depend on diversity. However, it should be noted that although the composition of the student body at CUA is not very diverse, the composition of the biology faculty is diverse with respect to gender, religious backgrounds, race, and ethnicity, and brings diverse perspectives to teaching and research conduct.

Comprehensive Examination Discussion *(Attachment 3)**:***
The Department of Biology analyzed the results from our comprehensive examinations for a five-year period (Fall 2003 through Fall 2007). During this time period the number of students taking the examination fluctuated between 5 and 11. All of the students passed the examination indicating a mastery of the field of biology as outlined in the "Goals and Assessment of Student Outcomes" document. Of the 56 students taking the examination, 41 of them (73%) received a "pass" grade and 15 of them (27%) received a "high pass". Following the 2004-2005 academic year, the format of this examination was changed in response to student feedback and faculty evaluation (see curricular improvements below).

Curricular Improvements

Because our department is small, we are able to gather a great deal of feedback through informal discussions with the students. Based on such discussion and on extensive dialogue at monthly faculty meetings, the format of our biology comprehensive examination was changed beginning with the academic year 2005-2006. In both the old and new format, the students are required to conduct an independent investigation of the relevant scientific literature in a current topic area of biology. In the old format, the students were required to respond to questions, which were provided in advance, regarding that topic during a predetermined examination period. In the new format, the students prepare a scholarly article discussing their particular topic. The faculty believes that the new format provides a better opportunity for the students to demonstrate their proficiency in scientific knowledge and their writing skills without the burden of producing a product in a time-limited examination period. We also revised the time-line of intermediate deadlines to make it more likely that the students could produce a quality article. For example, we previously required the students to submit an outline during finals week of the fall and this deadline has now been extended into the second or third week of the spring semester. The new deadline encourages the students to make progress during their winter break period.

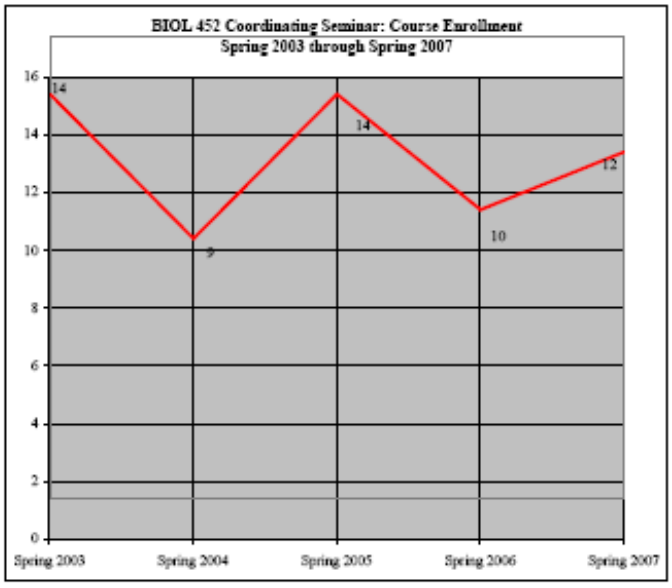
During the time period examined for this document (2002-2007), there were not any data available for course evaluations from Biol 452: Coordinating Seminar, predominately due to the format in which our courses are evaluated in the department. For example, when evaluating our other courses we ask questions about the quality of the lectures and the examinations. Since Biol 452 has a dramatically different format, such evaluations did not apply. In future semesters, we will design a course specific evaluation form for Biol 452 so that we can gather data regarding student satisfaction for this capstone course in our department.

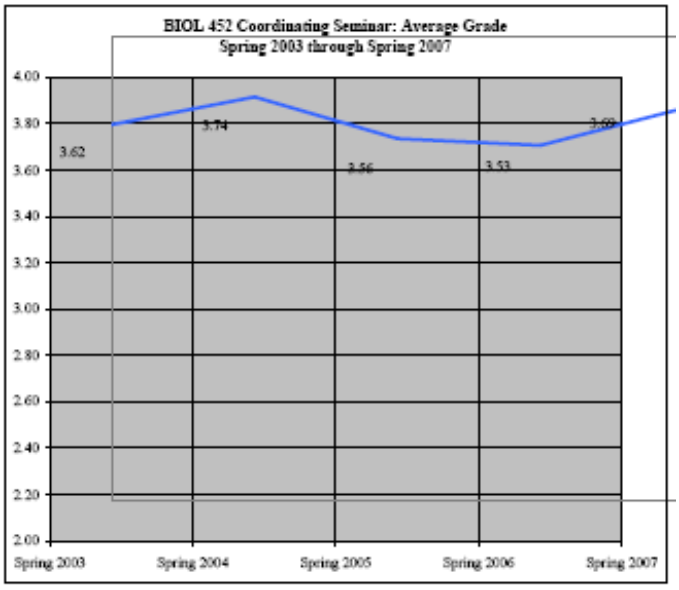
THE CATHOLIC UNIVERSITY OF AMERICA
Outcomes Assessment

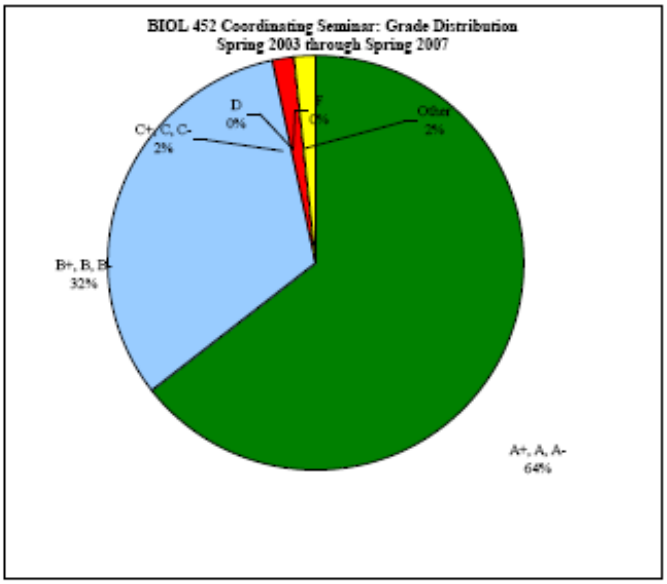
SENIOR SEMINAR SUMMARY DATA: DEPARTMENT OF BIOLOGY
BIOL 452 Coordinating Seminar

Term	Course Enrollment	Course Grade Avg.	Course Grade StDev.	Course Grades Grade Distribution A+, A, A-	B+, B, B-	C+, C, C-	D	F	Other**
Spring 2003	14	3.62	0.43	8	5				1
Spring 2004	9	3.74	0.46	7	2				
Spring 2005	14	3.56	0.50	9	5				
Spring 2006	10	3.53	0.56	6	3	1			
Spring 2007	12	3.69	0.37	8	4				

**The "Other" category includes grades of I, W, AU, and P.







April 21, 2008

Standard 12: General Education : The institution's curricula are designed so that students acquire and demonstrate college-level proficiency in general education and essential skills, including at least oral and written communication, scientific and quantitative reasoning, critical analysis and reasoning, and technological competency.

2007 National Survey of Student Engagement Mean Comparisons: Selected Catholic University General Education Goals

Department of Biology: Seniors

Graduates will demonstrate proficiency in oral and written communication, including argumentative essays, research papers, presentations, and creative and collaborative work employing a variety of media.	**Department of Biology**	*Department of Biology compared with:*								
		Catholic University			**Carnegie Peers**			**NSSE 2007**		
	Mean [a]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]
During the current school year, about how much reading and writing have you done? 1=none, 2=1-4, 3=5-10, 4=11-20, 5=more than 20										
Number of assigned textbooks, books, or book-length packs of course readings	2.88	3.35	.00	-.45	3.08	.00	-.21	3.13	.00	-.25
Number of books read on your own (not assigned) for personal enjoyment or academic enrichment	2.16	2.24	.00	-.09	2.17	.00	-.01	2.17	.00	-.01
Number of written papers or reports of **20 pages or more**	1.64	1.73	.00	-.12	1.59	.00	.06	1.62	.00	.03
Number of written papers or reports **between 5 and 19 pages**	2.84	2.99	.00	-.14	2.49	.00	.37	2.55	.00	.31
Number of written papers or reports of **fewer than 5 pages**	3.52	3.20	.00	.27	2.93	.00	.51	2.96	.00	.48
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? 1=very little, 2=some, 3=quite a bit, 4=very much										
Writing clearly and effectively	3.19	3.04	.00	.17	3.03	.00	.18	3.06	.00	.15
Speaking clearly and effectively	3.24	2.94	.00	.34	2.92	.00	.35	2.95	.00	.32

Graduates will show facility in critical thinking and reasoned analysis.	**Department of Biology**	*Department of Biology compared with:*								
		Catholic University			**Carnegie Peers**			**NSSE 2007**		
	Mean [a]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]	*Mean* [a]	*Sig* [b]	*Effect Size* [c]
During the current school year, how much has your coursework emphasized the following mental activities? 1=very little, 2=some, 3=quite a bit, 4=very much										
Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form	3.18	2.66	.00	.58	2.78	.00	.45	2.75	.00	.47
Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components	3.61	3.36	.00	.34	3.22	.00	.52	3.23	.00	.51
Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships	3.36	3.20	.00	.19	3.01	.00	.43	3.03	.00	.40
Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions	3.43	3.11	.00	.37	2.94	.00	.56	2.96	.00	.53
Applying theories or concepts to practical problems or in new situations	3.58	3.33	.00	.31	3.18	.00	.48	3.18	.00	.48
In your experience at your institution during the current school year, about how often have you done each of the following? 1=never, 2=sometimes, 3=often, 4=very often										
Put together ideas or concepts from different courses when completing assignments or during class discussions	2.78	2.97	.00	-.21	2.91	.00	-.16	2.90	.00	-.15
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? 1=very little, 2=some, 3=quite a bit, 4=very much										
Thinking critically and analytically	3.10	3.33	.00	-.31	3.32	.00	-.28	3.33	.00	-.30
Analyzing quantitative problems	3.17	2.70	.00	.47	3.05	.00	.13	3.04	.00	.15
Learning effectively on your own	3.34	2.97	.00	.41	2.99	.00	.40	3.00	.00	.38
Solving complex real-world problems	2.44	2.53	.00	-.09	2.75	.00	-.32	2.74	.00	-.31

a Weighted by gender, enrollment status, and institutional size.
b * p<.05 ** p<.01 *** p<.001 (2-tailed).
c Mean difference divided by comparison group standard deviation.

Graduates will demonstrate an understanding of scientific and quantitative reasoning.	Department of Biology	Department of Biology compared with: Catholic University			Carnegie Peers			NSSE 2007		
	Mean [a]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? 1=very little, 2=some, 3=quite a bit, 4=very much										
Thinking critically and analytically	3.10	3.33	.00	-.31	3.32	.00	-.28	3.33	.00	-.30
Analyzing quantitative problems	3.17	2.70	.00	.47	3.05	.00	.13	3.04	.00	.15

Graduates will demonstrate and ability to find information effectively using appropriate resources and technologies, critically assess the validity and relevance of that information, and utilize it in ethical and legal ways.	Department of Biology	Department of Biology compared with: Catholic University			Carnegie Peers			NSSE 2007		
	Mean [a]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]
In your experience at your institution during the current school year, about how often have you done each of the following? 1=never, 2=sometimes, 3=often, 4=very often										
Worked on a paper or project that required integrating ideas or information from various sources	3.18	3.41	.00	-.32	3.26	.00	-.11	3.29	.00	-.15
Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	2.29	2.70	.00	-.44	2.74	*	-.49	2.80	*	-.55
During the current school year, how much has your coursework emphasized the following mental activities? 1=very little, 2=some, 3=quite a bit, 4=very much										
Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions	3.43	3.11	.00	.37	2.94	.00	.56	2.96	.00	.53
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? 1=very little, 2=some, 3=quite a bit, 4=very much										
Learning effectively on your own	3.34	2.97	.00	.41	2.99	.00	.40	3.00	.00	.38

Graduates will demonstrate knowledge of and respect for different cultures and religions.	Department of Biology	Department of Biology compared with: Catholic University			Carnegie Peers			NSSE 2007		
	Mean [a]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]	Mean [a]	Sig [b]	Effect Size [c]
In your experience at your institution during the current school year, about how often have you done each of the following? 1=never, 2=sometimes, 3=often, 4=very often										
Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	2.29	2.70	.00	-.44	2.74	*	-.49	2.80	*	-.55
Had serious conversations with students of a different race or ethnicity than your own	2.43	2.70	.00	-.26	2.68	.00	-.25	2.66	.00	-.23
Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values	2.95	2.88	.00	.08	2.71	.00	.25	2.71	.00	.25
During the current school year, about how often have you done each of the following? 1=never, 2=sometimes, 3=often, 4=very often										
Tried to better understand someone else's views by imagining how an issue looks from his or her perspective	3.11	2.85	.00	.30	2.81	.00	.35	2.82	.00	.34
To what extent does your institution emphasize each of the following?1=very little, 2=some, 3=quite a bit, 4=very much										
Encouraging contact among students from different economic, social, and racial or ethnic backgrounds	2.27	1.97	.00	.31	2.41	.00	-.14	2.44	.00	-.17
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? 1=very little, 2=some, 3=quite a bit, 4=very much										
Understanding people of other racial and ethnic backgrounds	2.48	2.20	.00	.28	2.54	.00	-.06	2.59	.00	-.11

a Weighted by gender, enrollment status, and institutional size.
b * p<.05 ** p<.01 *** p<.001 (2-tailed).
c Mean difference divided by comparison group standard deviation.

THE CATHOLIC UNIVERSITY OF AMERICA
Institutional Assessment

COMPREHENSIVE EXAMINATION RESULTS
SCHOOL OF ARTS AND SCIENCES: DEPARTMENT OF BIOLOGY
AY2002-2003 to AY2006-2007

	Fail		Pass		High Pass		Pass w/Honors		
	#	%	#	%	#	%	#	%	TOTAL
AY2002-2003		0.00%	9	60.00%	6	40.00%		0.00%	15
AY2003-2004		0.00%	6	66.67%	3	33.33%		0.00%	9
AY2004-2005		0.00%	11	84.62%	2	15.38%		0.00%	13
AY2005-2006		0.00%	5	62.50%	3	37.50%		0.00%	8
AY2006-2007		0.00%	10	90.91%	1	9.09%		0.00%	11
TOTAL	0	0.00%	41	73.21%	15	26.79%	0	0.00%	56

Note: Students were included in the categories High Pass and Pass with Honors if these designations were explicitly indicated within the student's milestone record. Please contact the Office of Institutional Assessment if this data can also be determined through the student's final grade in the comprehensive requirement.