Texas A&M International University
Annual Institutional Effectiveness Review (AIER)

Date Submitted February 4, 2007

Assessment Period Covered (2006)

Academic Program/AES Unit Bachelor of Sciences with a major in Chemistry

Person(s) Preparing Review Dr. Sushma Krishnamurthy

Provide summary of the last cycle's use of results and changes implemented

In 2005, 1) The overall score from the embedded questions in examinations approached the benchmark of 70%. However, additional problems will be assigned and reviewed by the instructors to help the students improve their mastery of the subject.
The number of chemistry majors in this course remains at 6-10 making analysis difficult. The course was moved to the Fall semester (2005) to better fit in the program of study.

2) Departmental discussions indicate that students need more feedback from faculty panel regarding their research presentations and perhaps should be made more aware of the criteria used for evaluation of projects. Rubric will be presented and explained to students. Score sheet will be expanded to allow for more comments so that the students get feeback from multiple sources.

This year we have decided to focus on critical thinking skills, an essential tool common to all the sciences instead, rather than subject specific assessment. A third indirect assessment has also been added to our student learning outcomes.

In Y2006, 1) critical thinking skills 2) Student research presentations and 3) Student exit surveys were used as tools of assessment. The third means of assessment (Student Exit Surveys) was implemented for the first time in Fall 2006. Students presenting at the research seminars were made aware of the assessment criteria in advance. Student feedback was in the form of faculty comments and suggestions for improvement at the seminars

Section I: Planning and Implementation

Institutional Mission

Texas A&M International University, a Member of The Texas A&M University System, prepares students for leadership roles in their chosen profession in an increasingly complex, culturally diverse state, national, and global society … Through instruction, faculty and student research, and public service, Texas A&M International University embodies a strategic point of delivery for well-defined programs and services that improve the quality of life for citizens of the border region, the State of Texas, and national and international communities.

Academic Program or Administrative/Educational Support Unit Mission

The foremost mission of the department is to provide a high quality education for the students in Biology, Chemistry, Environmental Sciences and Geology. Upon completion of the program students will be prepared for employment in the private and public sectors as well as professional and graduate education. The department also strives to increase the body of scientific knowledge through research. We serve the university by providing General Education courses and service courses for students in Nursing, Kinesiology and Education.

Identify outcomes and the relationship to Strategic Plan

Outcome 1 ☐ **Is this outcome related to writing (QEP)?**
Students will apply critical thinking skills to solve problems in chemistry.

Identify Strategic Plan Goal related to Outcome 1
Goal 1 Academics

Identify Strategic Plan Objective related to Outcome 1
1.7 Establish and pursue student learning outcomes appropriate for each program with systematic assessment and use of results for continuous quality improvement.

Identify methods of assessment to be used
Embedded questions in examinations in required (core) upper division courses (Analytical Chemistry, Physical Chemistry, Inorganic Chemistry, and Biochemistry). The questions will be agreed upon by the chemistry faculty in each of the fields listed.

Indicate when assessment will take place
Annual

Criteria/Benchmark
Seventy percent of the chemistry senior students (majors) will have applied critical thinking skills to solve problems in chemistry (70% of the embedded examination questions answered correctly).

Outcome 2 ☐ **Is this outcome related to writing (QEP)?**
Students will demonstrate the ability to plan and execute a research project then present the material in a logical manner.

Identify Strategic Plan Goal related to Outcome 2
Goal 2 Research

Identify Strategic Plan Objective related to Outcome 2
2.3 Broaden the educational experience for students through support of student research/scholarship and student participation in faculty research/scholarship

Identify methods of assessment to be used
Means of Assessment Students will present the results of their research projects to a combined group of their peers. Faculty panel of at least 3 will evaluate projects using a common rubric.

Indicate when assessment will take place
Annual

Criteria/Benchmark
Seventy percent of the senior chemistry students will demonstrate the ability to plan and execute a research project, then present the material in a logical manner.

Outcome 3 ☐ **Is this outcome related to writing (QEP)?**
Student will have utilized their undergraduate education to acquire employment or acceptance in professional graduate programs

Identify Strategic Plan Goal related to Outcome 3
Goal 1 Academics

Identify Strategic Plan Objective related to Outcome 3
1.7 Establish and pursue student learning outcomes appropriate for each program with systematic assessment and use of results for continuous quality improvement.

Identify methods of assessment to be used
Exit survey for graduating seniors. Results of the survey will group students according to the following: employment resulting from the completion of the degree, graduate school placement, professional school placement, and undecided.

Indicate when assessment will take place
Annual

Criteria/Benchmark
No more than 30% of chemistry graduating seniors will be undecided in their career options on completion of their degrees.

Section II: Analysis of Results

When (term/date) was assessment conducted?

Outcome 1
Fall 2006

Outcome 2
April 30, 2006, Dec 1, 2006

Outcome 3
This assessment was not carried out.

What were the results attained (raw data)?

Outcome 1
CHEMISTRY SCORES

SPRING 2006
The assessment was carried not carried out in spring 2006

FALL 2006
CLASS SIZE: 4

	Correct	Incorrect	% CORRECT
Q1	3	1	66%
Q2	2	2	50%
Q3	1	3	33%
Q4	4	0	100%
Q5	2	2	50%
	12	8	59.8%

Overall Correct 60%
Overall Incorrect 40%
THE STANDARD 70% WAS NOT MET

Outcome 2
STUDENT RESEARCH PRESENTATIONS

	A	B	C	D	E	F	G	H	I	J	AVE
BIOL Presentation 1				6			5	5.0		8.0	6.0
BIOL Presentation 2	7.0			7			7	7.0	6.5	8.0	7.1
BIOL Presentation 3	7.0			9			8	9.0		8.0	8.2

BIOL Presentation 4	7.0	8			7	7.0		8.0				7.4
BIOL Presentation 5	7.0	6			7	7.0		8.0				7.0
BIOL Presentation 6	7.0	7			7	8.0		9.0				7.6
BIOL Presentation 7	7.0	6			7	9.0	7.0	8.0				7.3
BIOL Presentation 8		6				8.5		8.0				7.5
BIOL Presentation 9		7				7.0						7.0
BIOL Presentation 10		6.0	5				6.5					5.8
BIOL Presentation 11			5				6.0				7.0	6.0
BIOL Presentation 12		6				7.0	6.0		6.0			6.3
BIOL Presentation 13	8.0	8				9.5	9.0		8.0			8.5
BIOL Presentation 14		5		8.0	6	6.5	7.0	8.0	7.0	8.0		6.9
BIOL Presentation 15	7.5			7.0		7.5	8.0		7.0	7.0		7.3
BIOL Presentation 16	7.0			8.0		8.0	9.0			8.0		8.0
BIOL Presentation 17	7.5			7.0		7.5		8.0		8.0		7.6
BIOL Presentation 18	7.5			7.0		7.5	6.0	7.0	6.5	8.0		7.1
BIOL Presentation 19	6.5			8.0		7.0	7.0	7.0	6.0	7.0		6.9
BIOL Presentation 20		7.0			8.0		8.0	6.0		6.5		7.0 7.1
GRAD BIOL Presentation 21			7.0					8.0	8.0	8.0		6.0 7.0 7.3 GRAD
GRAD BIOL Presentation 22				8.0			8.5		8.0	7.0		8.0 7.9 GRAD
BIOL Presentation 23				8.0	8.0	9	9.0			7.0		9.0 8.3
CHEM Presentation 24		7.5		7.0	8.0	8	8.0			8.0		9.0 7.9 CHEM
BIOL Presentation 25			6.5	7.0	7	8.0			7.0	8.0		7.3

BIOL Presentation 26			6.5	8.0	7	8.0	7.0			7.0
7.3										
BIOL Presentation 27	5.0		4.5	6.0	4	5.0	5.0			7.0
5.2										
GRAD BIOL Presentation 28					7.5	8.0	7	7.0	8.0	8.0
8.0	7.6	GRAD								
GRAD BIOL Presentation 29					6.5	6.0	5	7.0	6.5	8.0
6.0	8.0	6.6	GRAD							
GRAD BIOL Presentation 30			7.0		7.0	8.0	7	7.5		7.0
4.0	8.0	6.9	GRAD							
BIOL Presentation 31	6.0		7.5	7.0	8	7.5		8.0	6.0	8.0
7.3										
GRAD BIOL Presentation 32			6.0		7.0	7.0	7	8.0		8.0
5.0		6.9	GRAD							
GRAD BIOL Presentation 33			7.0		7.0	6.0	8	7.5		8.0
6.0		7.1	GRAD							
AVERAGE SCORE	6.9	6.5	6.9	7.3	6.9	7.5	7.1	7.9	6.4	7.8

OVERALL AVERAGE
7.2

Evaluation was performed by 10 faculty members in the Department of Biology & Chemistry (Listed A-J)
25 BIOLOGY PRESENTATIONS
1 CHEMISTRY PRESENTATION
7 GRADUATE STUDENT PRESENTATIONS

BIOLOGY PRESENTATIONS
(UNDERGRADUATE)

7 PRESENTATIONS
OUT OF A TOTAL OF 25 PRESENTATIONS DID NOT MEET OUR STANDARDS
AVERAGE SCORE
7.2
72% OF THE PRESENTATIONS MET OUR STANDARDS

STANDARD MET

CHEMISTRY PRESENTATION #32
(UNDERGRADUATE)
1 PRESENTATION
SCORE

7.9
STANDARD MET

FALL 2006 STUDENT PRESENTATIONS

FALL 2006 STUDENT SEMINAR PRESENTATIONS
1-Dec-06

Pres. #	Faculty	Content	Format & style	Total	
1					
	A	5.0	3.0	8.0	
	B	5.0	3.0	8.0	
	C				
	D	5.0	3.0	8.0	
	E	5.0	3.0	8.0	
	F	5.0	4.0	9.0	
	G	5.0	3.0	8.0	
	H				
	I	5.0	3.0	8.0	
	J	5.0	4.0	9.0	
	K	5.0	3.0	8.0	
	L	4.0	3.0	7.0	
	M				
Average		4.9	3.2	8.1	
2					
	A	5.0	3.0	8.0	
	B	4.0	3.0	7.0	
	C				
	D	5.0	3.0	8.0	
	E	4.0	2.0	6.0	
	F	6.0	2.0	8.0	
	G	3.0	3.0	6.0	
	H				
	I	4.0	3.0	7.0	
	J	5.0	4.0	9.0	
	K	4.0	2.0	6.0	
	L	3.0	2.0	5.0	
	M				
Average		4.3	2.7	7.0	
3					
	A	4.0	3.0	7.0	CHEM
	B	4.0	3.0	7.0	PRESENTATION
	C				

	D	4.0	3.0	7.0	
	E	4.0	2.0	6.0	
	F	4.0	3.0	7.0	
	G	3.0	3.0	6.0	
	H	5.0	3.0	8.0	
	I	4.0	2.0	6.0	
	J	4.0	4.0	8.0	
	K	4.0	2.0	6.0	
	L	3.0	3.0	6.0	
	M				
Average		3.9	2.8	6.7	
4					
	A	4.0	2.0	6.0	
	B	4.0	3.0	7.0	
	C				
	D	4.0	3.0	7.0	
	E	3.0	2.0	5.0	
	F	4.0	2.0	6.0	
	G	3.0	2.0	5.0	
	H				
	I	5.0	3.0	8.0	
	J	4.0	4.0	8.0	
	K				
	L	3.0	3.0	6.0	
	M				
Average		3.8	2.7	6.4	
5					
	A	4.0	3.0	7.0	
	B	5.0	3.0	8.0	
	C				
	D	4.0	4.0	8.0	
	E	3.0	3.0	6.0	
	F	4.0	2.0	6.0	
	G	3.0	3.0	6.0	
	H				
	I	5.0	3.0	8.0	
	J	4.0	4.0	8.0	
	K				
	L	4.0	3.0	7.0	
	M				
Average		4.0	3.1	7.1	
6					

A	3.0	3.0	6.0	
B	2.0	3.0	5.0	
C	4.0	3.0	7.0	
D	2.0	2.0	4.0	
E	3.0	2.0	5.0	
F	3.0	2.0	5.0	
G	3.0	3.0	6.0	
H	3.0	3.0	6.0	
I	2.0	2.0	4.0	
J	3.0	4.0	7.0	
K	4.0	3.0	5.5	
L				
M				
Average	2.9	2.7	5.5	

7

A	4.0	4.0	8.0	
B	3.0	3.0	6.0	CHEM
C	5.0	3.0	8.0	PRESENTATION
D	4.0	4.0	8.0	
E	4.0	3.0	7.0	
F	4.0	3.0	7.0	
G	3.0	3.0	6.0	
H	5.0	3.0	8.0	
I	5.0	4.0	9.0	
J	4.0	4.0	8.0	
K	4.0	2.0		
L	4.0	3.0	7.0	
M	4.0	4.0	8.0	
Average	4.1	3.3	7.5	

8

A	4.0	3.0	7.0
B	4.0	3.0	7.0
C	6.0	3.0	9.0
D	4.0	3.0	7.0
E	4.0	2.0	6.0
F	4.0	4.0	8.0
G	3.0	2.0	5.0
H	5.0	3.0	8.0
I	3.0	2.0	5.0
J	4.0	4.0	8.0
K	5.0	3.0	8.0
L	3.0	3.0	6.0
M	5.0	2.0	7.0

Average	4.2	2.8	7.0	
9				
A	3.0	3.0	6.0	
B	2.0	3.0	5.0	CHEM
C				PRESENTATION
D	3.0	3.0	6.0	
E	3.0	1.0	4.0	
F	3.0	3.0	6.0	
G	3.0	2.0	5.0	
H	3.0	3.0	6.0	
I	3.0	3.0	6.0	
J	3.0	4.0	7.0	
K	4.0	3.0	7.0	
L	3.0	3.0	6.0	
M	2.0	4.0	6.0	
Average	2.9	2.9	5.8	
10				
A	4.0	5.0	9.0	
B	5.0	3.0	8.0	
C				
D	5.0	4.0	9.0	
E	5.0	4.0	9.0	
F	4.0	3.0	7.0	
G	4.0	3.0	7.0	
H	6.0	4.0	10.0	
I	5.0	2.0	7.0	
J	5.0	4.0	9.0	
K	5.0	3.0	8.0	
L	4.0	3.0	7.0	
M	5.0	4.0	9.0	
Average	4.8	3.5	8.3	

FACULTY: 13 faculty members in the department of biology & chemistry evaluated the student research presentations. Faculty are listed A-M in the table above.

Total # of presentations	10
Biology Presentations	8
Chemistry Presentations	2

CHEMISTRY SCORES

Overall Average Score for fall 2006: 6.7
1 out of 3 presentations (33.3%) met our benchmark

BENCHMARK : Seventy percent of the (chemistry) senior students will demonstrate the ability to plan and execute a research project, then present the material in a logical manner.
The score did not meet our benchmark of 70%.
STANDARD WAS NOT MET

OVERALL RESULT: The average scores for both the spring and fall semesters combined yielded a score of 6.95, which narrowly missed the benchmark of 7 (or 70%).
THE STANDARD WAS NOT MET FOR THE YEAR 2006.

Outcome 3
There were no graduating seniors in chemistry in Fall 2006.

Who (specify names) conducted analysis of data?
Outcome 1
Dr. Eugenio Jaramillo

Outcome 2
Dr. Eugenio Jaramillo and Dr. Hari Mandal

Outcome 3
N/A

When were the results and analysis shared and with whom (department chair, supervisor, staff, external stakeholders)? Submit minutes with data analysis to assessment@tamiu.edu (Please use Minutes Template located on the Project INTEGRATE web page.)
Spring 2006: The results of the student research assessment was shared with the faculty first by e-mail and them again at a department meeting on September 15, 2006. Hard copies of the results of the critical thinking questions were distributed and also discussed at the meeting.

Fall 2006: The results of the critical thinking questions and student research seminars were discussed at length at our first department meeting held on Feb 2, 2007. Student exit surveys were not administered and hence not discussed. Hard copies of the results were dirstributed to the department faculty.

NOTE: Submit all assessment documentation (i.e., surveys, rubrics, course exams with embedded questions, etc.) to the Office of Institutional Effectiveness and Planning.

Use of Results: Indicate whether criteria were met/not met and what changes, if any, have been identified based on the data collected?

Outcome 1

☐ **Met** ☒ **Not Met**
Provide narrative: The benchmark of 70% was not met.

Outcome 2
☐ **Met** ☒ **Not Met**
Provide narrative: The standard for this student learning outcome was not met for Y2006.

Outcome 3
☐ **Met** ☐ **Not Met**
Provide narrative: This student learning outcome was not measured since there were no graduating seniors in chemistry in Fall 2006.

How have these data-based changes improved your program/unit?
The data generated will improve the chemistry program as areas of weakness have been identified. For changes to occur, there must be increased funding in this area in terms of research and basic laboratory equipment. Hiring and retaining qualified faculty is key to the success of this discipline.

Section III: Programmatic Review

Are resources affected by the changes identified in Section II? ☒ Yes ☐ No

If so, specify the effect(s) using the chart below:

Funding	Physical	Other
☒ New resources required	☐ New or reallocated space	☒ Primarily faculty/staff time
☒ Reallocation of current funds		☐ University rule/procedure change only
		☐ Other: Enter text here

Provide a narrative description and justification for requested resources (include linkage to Strategic Plan)

For any change to occur in chemistry, there must be increased support with respect to funding research and purchasing basic laboratory equipment. Hiring and retaining qualified faculty is key to the success of this discipline.

Identify proposed outcomes for the next assessment cycle:
Continuation of present outcome(s) – (Indicate reason for continuation): More data is required for a meaningful interpretation of the results. All the Student learning outcomes listed have been in existance for about 1 year. Small sample sizes are harder to analyze statistically.
New Outcome(s) – (List outcomes below): Enter text here
Modification of present outcome(s) – (Indicate reason for modification): Enter text here

****** This section to be completed by dean/director/vice-president ******

Are resources requested a priority for the academic program/AES unit?

☐ **Yes** ☐ **No**

Comments:

Enter text here

If funding, physical or other resources were requested, what is the impact of the budget decisions on the academic program/AES unit?

Enter text here