

**March 6, 2007**

**Chemistry Faculty Meeting to Discuss Assessment Results for 5  
Chemistry Degree Programs**

(The following pages summarize our discussions.)

In attendance: Jung-mo Ahn, Kenneth J. Balkus, Jr., Michael E. Biewer, Gregg R. Dieckmann, John P. Ferraris, Bruce Gnade, Warren J. Goux, Donovan Haines, Inga H. Musselman, Steven O. Nielsen (signature page for attendance at end of this document)

**B.A. Chemistry**

***Analysis of Degree Program***

**• What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?**

The assessments identified the following strengths for the outcomes/objectives of the B.A. Chemistry degree program:

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 8 courses in the program [CHEM 1311 or CHEM 1315; CHEM 1111 or CHEM 1115; CHEM 1312 or CHEM 1316; CHEM 1112 or CHEM 1116; CHEM 2323; CHEM 2123; CHEM 2401; CHEM 3321]. Data collected every semester courses are offered.

*CHEM 1111, CHEM 1311, and CHEM 2323 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- GAIN IN DEPTH KNOWLEDGE (measure 4): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 6 courses in the program [CHEM 2325; CHEM 2125; CHEM 3471; CHEM 3472; BIOL/CHEM 3361 and BIOL/CHEM 3161 or CHEM 4335; CHEM 3341 or CHEM 3322]. Data collected every semester.

*CHEM 3341, CHEM 3361, and CHEM 3472 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- GAIN KNOWLEDGE OF MATH AND PHYSICS (measure 7): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 3 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 8 courses in the program [MATH 2417; MATH 2419; MATH 2451; MATH 2418 and MATH 2018 or STAT 3332; PHYS 2325; PHYS 2326; PHYS 2125; PHYS 2126]. Data collected every semester course is offered.

*The supporting math and physics courses, MATH 2417, MATH 2451, and PHYS 2325, were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 9): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 4 will be assessed on a scale of 0 (very poor) to 5 (excellent) for NATS 4310.

*NATS 4310, which satisfies the UTD core curriculum advanced writing requirement, was reviewed very well via the IAS course evaluation form. An IAS score of  $\geq 3.0$  was reported.*

**• What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?**

The assessments identified the following outcomes/objectives of the B.A. Chemistry degree program that will require continued attention.

- FUNDAMENTAL KNOWLEDGE (measure 3); IN DEPTH KNOWLEDGE (measure 6); GAIN MATH/PHYSICS KNOWLEDGE (measure 8); DEVELOP COMMUNICATION SKILLS (measure 10): Exit survey for students earning BA Chemistry degree. Data collected every year.

*This exit survey has not been implemented as it is still in development.*

### *Information for Executive Summary*

• **ACTION PLAN.** Write about how you are going to close the loop and improve student's learning. List things you have learned about students' learning in your program.

• An exit survey is being developed for students graduating with a B.A. in Chemistry. Our target is to have the survey ready to administer in Fall 2007.

## **B.S. Chemistry**

### ***Analysis of Degree Program***

- What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?**

The assessments identified the following strengths for the outcomes/objectives of the B.S. Chemistry degree program:

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 15 courses in the program [CHEM 1311 or CHEM 1315; CHEM 1111 or CHEM 1115; CHEM 1312 or CHEM 1316; CHEM 1112 or CHEM 1116; CHEM 2323; CHEM 2123; CHEM 2401; CHEM 3321; CHEM 3341; BIOL/CHEM 3361; BIOL/CHEM 3161]. Data collected every semester courses are offered.

*CHEM 1111 and CHEM 1311 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- GAIN IN DEPTH KNOWLEDGE (measure 4): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 9 courses in the program [CHEM 2325; CHEM 2125; CHEM 3322; CHEM 3471; CHEM 3472; BIOL/CHEM 3362 and BIOL/CHEM 3162 or CHEM 4335; CHEM 4472]. Data collected every semester courses are offered.

*CHEM 3471 and CHEM 3472 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- GAIN IN DEPTH KNOWLEDGE (measure 6): In-class assessment for 3 sections of CHEM 4V91 (research in chemistry) chosen randomly, instructor will provide written course evaluation based on learning objectives/assessment methods. Data collected every semester.

*The assessment revealed that the undergraduate research course (CHEM 4V91) is running very smoothly.*

- GAIN KNOWLEDGE OF MATH AND PHYSICS (measure 7): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 3 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 10 courses in the program [MATH 2417; MATH 2419; MATH 2451; MATH 2418 and MATH 2018 or STAT 3332; PHYS 2325; PHYS 2326; PHYS 2125; PHYS 2126]. Data collected every semester.

*The supporting math and physics courses, MATH 2417, MATH 2451, and PHYS 2325, were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 8): In-class assessment For 3 sections of CHEM 4V91 (research in chemistry) chosen randomly, instructor will provide written course evaluation based on learning objectives/assessment methods. Data collected every semester.

*The assessment revealed that the undergraduate research course (CHEM 4V91) is running very smoothly.*

**• What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?**

The assessments identified the following outcomes/objectives of the B.S. Chemistry degree program that will require continued attention.

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 15 courses in the program [CHEM 1311 or CHEM 1315; CHEM 1111 or CHEM 1115; CHEM 1312 or CHEM 1316; CHEM 1112 or CHEM 1116; CHEM 2323; CHEM 2123;

CHEM 2401; CHEM 3321; CHEM 3341; BIOL/CHEM 3361; BIOL/CHEM 3161]. Data collected every semester courses are offered.

*The score on the IAS course evaluation form for CHEM 3321 did not meet the target of  $\geq 3.0$ .*

- GAIN FUNDAMENTAL KNOWLEDGE; GAIN IN DEPTH KNOWLEDGE; GAIN KNOWLEDGE OF MATH AND PHYSICS; DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 3): Exit survey for students earning BS Chemistry degree Data collected every year.

*This exit survey has not been implemented as it is still in development.*

- GAIN IN DEPTH KNOWLEDGE (measure 4): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 9 courses in the program [CHEM 2325; CHEM 2125; CHEM 3322; CHEM 3471; CHEM 3472; BIOL/CHEM 3362 and BIOL/CHEM 3162 or CHEM 4335; CHEM 4472]. Data collected every semester courses are offered.

*The score on the IAS course evaluation form for CHEM 2325 did not meet the target of  $\geq 3.0$ .*

### *Information for Executive Summary*

- **ACTION PLAN. Write about how you are going to close the loop and improve student's learning. List things you have learned about students' learning in your program.**

- With regards to measures 1 and 4, the instructors of courses for which the IAS scores did not meet the target of  $\geq 3.0$  will review/evaluate the summary form to identify ways in which the course can be improved.
- An exit survey is being developed for students graduating with a B.S. in Chemistry. Our target is to have the survey ready to administer in Fall 2007.

- Although the undergraduate research course (CHEM 4V91) reviewed well, the faculty believe that the following changes would improve the course even more.
  1. Decouple the research and writing requirements in CHEM 4V91 by adding CHEM 4390, in which students will be enrolled during their last semester of research. Starting Fall 2007, CHEM 4390 (Research and Advanced Writing in Chemistry) will satisfy the university's core writing requirement.
  2. In the assessment of Fall 2006 CHEM 4V91 courses, we learned that the faculty need to better communicate to the students the research and writing expectations of the course.

## **B.S. Biochemistry**

### ***Analysis of Degree Program***

- What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?**

The assessments identified the following strengths for the outcomes/objectives of the B.S. Biochemistry degree program:

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 16 courses in the program [CHEM 1311 or CHEM 1315; CHEM 1111 or CHEM 1115; CHEM 1312 or CHEM 1316; CHEM 1112 or CHEM 1116; CHEM 2323; CHEM 2123; CHEM 2401; CHEM 3321; BIOL/CHEM 3361 and BIOL/CHEM 3161; BIOL 2311 and BIOL 2111]. data collected every semester.

*CHEM 1111, CHEM 1311, CHEM 3361 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- GAIN IN DEPTH KNOWLEDGE (measure 4): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 11 courses in the program [CHEM 2325; CHEM 2125; CHEM 3322; CHEM 3472; BIOL/CHEM 3362 and BIOL/CHEM 3162; BIOL 3301 and BIOL 3101; BIOL 3302 and BIOL 3102; BIOL 3380]. Data collected every year.

*CHEM 3472 was reviewed very well via the IAS course evaluation form. An IAS score of  $\geq 3.0$  was reported.*

- GAIN IN DEPTH KNOWLEDGE (measure 6): In-class assessment for 3 sections of BIOL/CHEM 3V92 (research in biochemistry) or CHEM 4V91 (research in chemistry), chosen randomly, instructor will provide written course evaluation based on learning objectives/assessment methods. Data collected every semester.



*The assessment revealed that the undergraduate research course (CHEM 4V91) is running very smoothly.*

- GAIN KNOWLEDGE OF MATH AND PHYSICS (measure 7): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 3 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 9 courses in the program [MATH 2417; MATH 2419; MATH 2451; PHYS 2325 or PHYS 3341; PHYS 2326 or PHYS 3342; PHYS 2125; PHYS 2126]. Data collected every semester.

*The supporting math and physics courses, MATH 2417, MATH 2451, and PHYS 2325, were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 8): In-class assessment for 3 sections of BIOL/CHEM 3V92 (research in biochemistry) or CHEM 4V91 (research in chemistry), chosen randomly, instructor will provide written course evaluation based on learning objectives/assessment methods. Data collected every semester.

*The assessment revealed that the undergraduate research course (CHEM 4V91) is running very smoothly.*

**• What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?**

The assessments identified the following outcomes/objectives of the B.S. Biochemistry degree program that will require continued attention.

- GAIN FUNDAMENTAL KNOWLEDGE; GAIN IN DEPTH KNOWLEDGE; GAIN KNOWLEDGE OF MATH AND PHYSICS; DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 3): Exit survey for students earning BS Biochemistry degree. Data collected every year.

*This exit survey has not been implemented as it is still in development.*

- **GAIN IN DEPTH KNOWLEDGE (measure 4):** In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 3 of the following 11 courses in the program [CHEM 2325; CHEM 2125; CHEM 3322; CHEM 3472; BIOL/CHEM 3362 and BIOL/CHEM 3162; BIOL 3301 and BIOL 3101; BIOL 3302 and BIOL 3102; BIOL 3380]. Data collected every year.

*The scores on the IAS course evaluation forms for CHEM 2325 and BIOL 3301 did not meet the target of  $\geq 3.0$ .*

### *Information for Executive Summary*

- **ACTION PLAN. Write about how you are going to close the loop and improve student's learning. List things you have learned about students' learning in your program.**

- With regards to measure 4, the instructors of courses for which the IAS scores did not meet the target of  $\geq 3.0$  will review/evaluate the summary form to identify ways in which the course can be improved.

- An exit survey is being developed for students graduating with a B.S. in Biochemistry. Our target is to have the survey ready to administer in Fall 2007.

- Although the undergraduate research course (CHEM 4V91) reviewed well, the faculty believe that the following changes would improve the course even more.

1. Decouple the research and writing requirements in CHEM 4V91 by adding CHEM 4390, in which students will be enrolled during their last semester of research. Starting Fall 2007, CHEM 4390 (Research and Advanced Writing in Chemistry) will satisfy the university's core writing requirement.
2. In the assessment of Fall 2006 CHEM 4V91 courses, we learned that the faculty need to better communicate to the students the research and writing expectations of the course.

## M.S. Chemistry

### ***Analysis of Degree Program***

- **What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?**

The assessments identified the following strengths for the outcomes/objectives of the M.S. Chemistry degree program:

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 2 of the following 4 courses in the program [CHEM 5314; CHEM 5331; CHEM 5341; CHEM 5355]. Data collected every semester.

*CHEM 5314 and CHEM 5331 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 4): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) in the following course in the program [CHEM 6389].

*CHEM 6389 was reviewed very well via the IAS course evaluation form. An IAS score of  $\geq 3.0$  was reported.*

- **What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?**

The assessments identified the following outcomes/objectives of the M.S. Chemistry degree program that will require continued attention.

- GAIN FUNDAMENTAL KNOWLEDGE; DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS; LEARN STRATEGIC RESEARCH SKILLS;

CONTRIBUTE NEW KNOWLEDGE (measure 3): Exit survey for students earning MS Chemistry degree. Data collected every year.

*This exit survey has not been implemented as it is still in development.*

### *Information for Executive Summary*

• **ACTION PLAN. Write about how you are going to close the loop and improve student's learning. List things you have learned about students' learning in your program.**

• An exit survey is being developed for students graduating with a Ph.D. in Chemistry. Our target is to have the survey ready to administer in Fall 2007.

## Ph.D. Chemistry

### ***Analysis of Degree Program***

- **What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?**

The assessments identified the following strengths for the outcomes/objectives of the Ph.D. Chemistry degree program:

- GAIN FUNDAMENTAL KNOWLEDGE (measure 1): In-class assessment Using the Instructional Assessment System (IAS) course evaluation form, goal 1 will be assessed on a scale of 0 (very poor) to 5 (excellent) randomly in 2 of the following 4 courses in the program [CHEM 5314; CHEM 5331; CHEM 5341; CHEM 5355]. Data collected every year.

*CHEM 5314 and CHEM 5331 were reviewed very well via the IAS course evaluation form. IAS scores of  $\geq 3.0$  were reported.*

- DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS (measure 5): In-class assessment using the Instructional Assessment System (IAS) course evaluation form, goal 2 will be assessed on a scale of 0 (very poor) to 5 (excellent) in the following course in the program [CHEM 6389].

*CHEM 6389 was reviewed very well via the IAS course evaluation form. An IAS score of  $\geq 3.0$  was reported.*

- GAIN ADVANCED KNOWLEDGE (measure 13): The dissertations committees for students in the 3 sections of CHEM 8V91 in 3.3 will provide written assessment of student's research skills based on annual committee meeting and/or Ph.D. qualifying exam. Data collected every year.

and

DEMONSTRATE CONTRIBUTIONS TO CHEMISTRY (measure 16): The dissertation committees for students in the 3 sections of CHEM 8V91 in 4.2, will provide written assessment of student's creative and independent contributions to chemistry based on annual committee meeting and/or Ph.D. qualifying exam. Data collected every year.

*The results of the qualifying exam, in which a student prepares and defends an original research proposal, revealed a weakness in the students' retention of fundamental coursework. The result demonstrates the strength of the qualifying exam format.*

**• What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?**

The assessments identified the following outcomes/objectives of the Ph.D. Chemistry degree program that will require continued attention.

- GAIN FUNDAMENTAL KNOWLEDGE; DEVELOP ORAL AND WRITTEN COMMUNICATION SKILLS; GAIN ADVANCED KNOWLEDGE; DEMONSTRATE CONTRIBUTIONS TO CHEMISTRY; CONTRIBUTE NEW KNOWLEDGE (measure 4): Exit survey for students earning PhD Chemistry degree. Data collected every year.

*This exit survey has not been implemented as it is still in development.*

- GAIN ADVANCED KNOWLEDGE (measure 13): The dissertations committees for students in the 3 sections of CHEM 8V91 in 3.3 will provide written assessment of student's research skills based on annual committee meeting and/or Ph.D. qualifying exam. Data collected every year.

and

DEMONSTRATE CONTRIBUTIONS TO CHEMISTRY (measure 16): The dissertation committees for students in the 3 sections of CHEM 8V91 in 4.2, will provide written assessment of student's creative and

independent contributions to chemistry based on annual committee meeting and/or Ph.D. qualifying exam. Data collected every year.

*The results of the qualifying exam, in which a student prepares and defends an original research proposal, revealed a weakness in the students' retention of fundamental coursework.*

### *Information for Executive Summary*

• **ACTION PLAN. Write about how you are going to close the loop and improve student's learning. List things you have learned about students' learning in your program.**

- An exit survey is being developed for students graduating with a Ph.D. in Chemistry. Our target is to have the survey ready to administer in Fall 2007.
- In order to address the weakness in the students' retention of fundamental coursework, observed during the qualifying exam, 1<sup>st</sup> and 2<sup>nd</sup> year graduate student Teaching Assistants will be rotated through fundamental undergraduate laboratory courses.

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