Sam Houston State University
Office of Assessment

2023-2024

College of Science and Engineering Technology

School of Agricultural Sciences

Agricultural Business BS

Goal 1-Professional Marketplace Skills

Goal Description:

Students earning a BS in Agribusiness will demonstrate the skills necessary to seek initial job placement as they begin their professional careers.

Providing Department: Agricultural Business BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Goal 1- Objective 1: Professional Career Entry Skills

Learning Objective Description:

Students completing the BS in Agribusiness will be able to develop resumes appropriate to their education and communicate about their skill set and desired careers.

RELATED ITEM LEVEL 2

Goal 1- Objective 1, Indicator 1: Professional Employment Portfolio in AGBU 4363

Indicator Description:

As part of the AGBU 4363 course, students will develop a resume , which will be evaluated according to a rubric that the faculty developed in conjunction with the SHSU Career Services staff.

Attached Files

4363 Resume Rubric.docx

Criterion Description:

At least 70% of the students achieving a score of 3 (meets expectations) or higher on a 5-point scale for both cover letter and resume.

Findings Description:

The faculty member who taught this course left the university. Hence, we do not have data for this indicator. Our new tenure track faculty will be teaching this course from 2024 Fall and will collect data using the already developed rubric

RELATED ITEM LEVEL 3

Goal 1- Objective 1, Indicator 1: Action: Professional Employment Portfolio in AGBU 4363

Action Description:

Since the faculty who taught this course left the university, no data was collected. We will reevaluate our actions after we collect and analyze data for the next cycle.

Goal 2- Application of Key Disciplinary Concepts and Skills

Goal Description:

Students will be able to apply conceptual knowledge and practical skills gained throughout the Agribusiness Program curriculum.

Providing Department: Agricultural Business BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Goal 2- Objective 1: Strategic Analysis of Agribusiness

Learning Objective Description:

Students will be able to 1) investigate and acquire appropriate data/information from various legitimate, public sources, 2) conduct an assessment of internal and external environmental data/information, 3) complete a financial analysis of the company from publicly available information and 4) create a strategic plan for a publicly-traded agribusiness company 5) Create a capstone project report working in teams demonstrating the soft skills of written communication teamwork.

RELATED ITEM LEVEL 2

Goal 2- Objective 1, Indicator 1: Strategic Plans for Publicly Traded Agribusinesses in AGBU 4375

Indicator Description:

Students, working as part of a team, will develop a capstone project report. Results from each capstone project will be shared in a professional presentation before the students' peers and faculty. All students enrolled in the Agribusiness program must complete AGBU 4375 in their senior year. AGBU 4375 addresses key concepts and skills relevant to the field of agribusiness and strategic management. Faculty members will score the assignments using a scale of 1 - 5 with 3 "meets expectations," 4 "exceeds expectations," and 5 "far exceeds expectations." A single rubric will be used to evaluate all parts of this Learning Objective.

Attached Files

4375 rubric.docx

Criterion Description:

At least 80% of the students will achieve a 3 (meets expectations) or higher on the 5-point scale on all categories in the rubric.

Findings Description:

22 students were divided into five teams (two five-person teams and three five-person teams). Each team acted as a consulting firm, performing the strategic analysis of an agribusiness company of their choice. The teams developed write-ups in each class, which served as parts of the project. The instructor made edits and provided suggestions on these write-ups. Students addressed the comments and submitted external, internal, financial, and strategic analyses. The instructor made corrections and provided instructions for improvement on these reports. The teams addressed the comments and compiled the reports into the final project report. The final project report was evaluated using the rubric provided above.

Most of the initial write-ups developed in class had considerable issues related to both content and technical writing. Technical writing and style were the areas that required major improvements. However, because of the continual feedback and edits from the instructor, all the final reports scored 3 or more on average. The weakest area in final reports was highly correlated with the distribution of the report sections, and the abilities of the section leader. I am planning to solve this issue by motivating higher level of participation of all group members in all sections.

The evaluation of the final reports of all the teams in Spring 2024 are provided below.

Team 1

Agribusiness Firm: Tyson Foods

Attribute	Scale					Grade
	1	2	3	4	5	
Internal Company Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.5

External Environment Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.7
Financial Analysis	Missing major components	Incomplete, but with good explanation for what is there	Complete, but with poor or no explanation	Complete, but somewhat lacking full explanation	Knowledgeable with Depth of Understanding	4.6
Strategic Analysis	Poor	Little understanding	Understands Concepts	Knowledgeable	Knowledgeable with Depth of Understanding	4.3
Technical writing skills (grammar, typo, spelling, etc.)	2 or more errors per page avg.	1 or more errors per page avg.	4 Errors max	2 Errors max	No Errors	4.3
Style (formatting, organization references, etc.)	Major flaws in formatting and organization. More than 12 errors in references	Minor flaws in formatting and organization. Less than 8 errors in references	Good formatting and organization. Less than 5 errors in references	Good formatting and organization. Less than 3 errors in references	Excellent formatting and organization. No errors inreferences	3.8

Team 2

Agribusiness Firm: Smucker's

Attribute	Scale					Grade
	1	2	3	4	5	
Internal Company Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.5
External Environment Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.6
Financial Analysis	Missing major components	Incomplete, but with good explanation for what is there	Complete, but with poor or no explanation	Complete, but somewhat lacking full explanation	Knowledgeable with Depth of Understanding	4.6
Strategic Analysis	Poor	Little understanding	Understands Concepts	Knowledgeable	Knowledgeable with Depth of Understanding	4.5
Technical writing skills (grammar, typo, spelling, etc.)	2 or more errors per page avg.	1 or more errors per page avg.	4 Errors max	2 Errors max	No Errors	4.2
Style (formatting, organization references, etc.)	Major flaws in formatting and organization. More than 12 errors in references	Minor flaws in formatting and organization. Less than 8 errors in references	Good formatting and organization. Less than 5 errors in references	Good formatting and organization. Less than 3 errors in references	Excellent formatting and organization. No errors inreferences	3.8

Team 3

Agribusiness Firm: Coca Cola

Attribute	Scale					Grade
	1	2	3	4	5	
Internal Company Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.3
External Environment Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	3.6
Financial Analysis	Missing major components	Incomplete, but with good explanation for what is there	Complete, but with poor or no explanation	Complete, but somewhat lacking full explanation	Knowledgeable with Depth of Understanding	4.6
Strategic Analysis	Poor	Little understanding	Understands Concepts	Knowledgeable	Knowledgeable with Depth of Understanding	3.0
Technical writing skills (grammar, typo, spelling, etc.)	2 or more errors per page avg.	1 or more errors per page avg.	4 Errors max	2 Errors max	No Errors	3.8
Style (formatting, organization references, etc.)	Major flaws in formatting and organization. More than 12 errors in references	Minor flaws in formatting and organization. Less than 8 errors in references	Good formatting and organization. Less than 5 errors in references	Good formatting and organization. Less than 3 errors in references	Excellent formatting and organization. No errors inreferences	3.2

Team 4

Agribusiness Firm: CNH Industrial

Attribute	Scale					Grade
	1	2	3	4	5	
Internal Company Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.6
External Environment Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.7
Financial Analysis	Missing major components	Incomplete, but with good explanation for what is there	Complete, but with poor or no explanation	Complete, but somewhat lacking full explanation	Knowledgeable with Depth of Understanding	4.6
Strategic Analysis	Poor	Little understanding	Understands Concepts	Knowledgeable	Knowledgeable with Depth of Understanding	4.6

Technical writing skills (grammar, typo, spelling, etc.)	2 or more errors per page avg.	1 or more errors per page avg.	4 Errors max	2 Errors max	No Errors	4.3
Style (formatting, organization references, etc.)	Major flaws in formatting and organization. More than 12 errors in references	Minor flaws in formatting and organization. Less than 8 errors in references	Good formatting and organization. Less than 5 errors in references	Good formatting and organization. Less than 3 errors in references	Excellent formatting and organization. No errors inreferences	3.9

Team 5

Agribusiness Firm: The Andersons

Attribute	Scale					Grade
	1	2	3	4	5	
Internal Company Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.5
External Environment Analysis	Missing or seriously lacking	Adequate, with weak explanations	Adequate, with acceptable explanations	Well Developed	Exceptional	4.5
Financial Analysis	Missing major components	Incomplete, but with good explanation for what is there	Complete, but with poor or no explanation	Complete, but somewhat lacking full explanation	Knowledgeable with Depth of Understanding	4.4
Strategic Analysis	Poor	Little understanding	Understands Concepts	Knowledgeable	Knowledgeable with Depth of Understanding	4.4
Technical writing skills (grammar, typo, spelling, etc.)	2 or more errors per page avg.	1 or more errors per page avg.	4 Errors max	2 Errors max	No Errors	4.0
Style (formatting, organization references, etc.)	Major flaws in formatting and organization. More than 12 errors in references	Minor flaws in formatting and organization. Less than 8 errors in references	Good formatting and organization. Less than 5 errors in references	Good formatting and organization. Less than 3 errors in references	Excellent formatting and organization. No errors inreferences	4.0

The average scores of all teams across the areas are presented in the following Table.

	TEAM 1	TEAM 2	TEAM 3	TEAM 4	TEAM 5	AVG.
INTERNAL	4.5	4.5	4.3	4.6	4.5	**4.48**
EXTERNAL	4.7	4.6	3.6	4.7	4.5	**4.42**
FINANCIAL	4.6	4.6	4.6	4.6	4.4	**4.56**
STRATEGIC	4.3	4.5	3	4.6	4.4	**4.16**
TECHNICAL	4.3	4.2	3.8	4.3	4	**4.12**
STYLE	3.8	3.8	3.2	3.9	4	**3.74**

AVG.	**4.37**	**4.37**	**3.75**	**4.45**	**4.30**	

RELATED ITEM LEVEL 3

Goal 2- Objective 1, Indicator 1: Action: Strategic Plans for Publicly Traded Agribusiness in AGBU 4375

Action Description:

Since all teams surpassed the current criteria of "at least 80% of the students will achieve a 3 or higher on the 5-point scale on all categories of the rubric", we have decided to change the criteria to "at least 80% of the students will achieve a **3.5** or higher on the 5-point scale on all categories of the rubric". The results also showed that "technical writing" and "style" were the weakest areas for all teams. So, the instructor will emphasis on these aspects in future semesters.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

After reviewing the specific Goals/Objectives/Indicators of this program, the faculty in agriculture have determined that these items do not wholly reflect the needs and goals of our current students. As a result, we will reevaluate all Goals/Objectives/Indicators to better match the needs of our program and the students who are part of it. It is expected that this will require a deep look at what is considered success in this area and will likely cause significant change to the Goals/Objectives/Indicators for the coming academic year.

Update of Progress to the Previous Cycle's PCI:

After a comprehensive evaluation of specific Goals/Objectives/Indicators of this program conducted last year, we have decided to focus on the current two goals and their objectives and indicators until we have sufficient evidence to trigger a reevaluation

New Plan for Continuous Improvement Item

Closing Summary:

Since the instructor left the university, we were unable to collect data on indicators for goal 1. We will collect this data in coming semester and analyze the data to evaluate progress and possible plans for improvement. The results for the indicators of goal 2 prompted us to revise the previously set criteria. We will continue to monitor the results for future semesters and plan accordingly to ensure continuous improvement.

Agricultural Communication BS

1-Develop Professional Marketplace Skills

Goal Description:

Students earning a BS in Agricultural Communications will develop the skills necessary to seek initial job placement as they begin their professional careers.

Providing Department: Agricultural Communication BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

1- Professional Online Identity

Learning Objective Description:

Students will develop a professional online identity.

RELATED ITEM LEVEL 2

1- LinkedIn Profiles

Indicator Description:

All students seeking a degree in Agricultural Communications are required to complete AGRI 4120 as upperclassmen. During the completion of this course all students must develop a professional online identity using LinkedIn. Profiles are evaluated using a faculty-developed evaluation (criterion) list, which is attached to this assessment plan.

Attached Files

Checklist for Creating a LinkedIn Profile-50 pts.pdf

Criterion Description:

Our expectation is that 70% of students will achieve all requirements as specified by the evaluation. The 2019-2020 assessment cycle served as a benchmark and contained 7 students. the 2020-2021 assessment cycle contained 5 students for a total of 12. Assessment data will be collected until 25 students are contained in the data set.

Findings Description:

85% of my students were able to complete the assigned initiative to develop and curate a professional profile consisting of a professional photo and description. Students who did not fall in this 85% either 1) did not create a profile or 2) failed to upload a professional profile photo or detailed professional description.

RELATED ITEM LEVEL 3

1- LinkedIn Profiles

RELATED ITEM LEVEL 1

1-Development of Professional Marketplace Skills

Learning Objective Description:

Students completing the BS in Agricultural Communications will demonstrate skills necessary to compete in the professional marketplace.

RELATED ITEM LEVEL 2

1-AGRI 4120- Professional Employment Portfolio

Indicator Description:

All students seeking a degree in Agricultural Communications are required to complete AGRI 4120 in their senior year. The course addresses essential skills necessary for job placement in the work force – resume preparation, interview skills, technical writing skills and employment opportunities. Faculty will review student assignments compiled into a portfolio and assess student performance

using a faculty-developed rubric. In previous years, 5 students have been randomly selected for evaluation, in the upcoming assessment cycle, a maximum of 10 students will be randomly selected. Should the available pool be fewer than 10 students, all ACOM students enrolled in the specified course during the assessment period will be evaluated.

We will retain the indicator until 25 students have been included in the assessment.

Attached Files

AGRI 4120 Portfolio Rubric Matrix

Criterion Description:

Our previous goal was that at least 70% of ACOM students enrolled in AGRI 4120 would perform at an acceptable level and score a 3 (meets expectations) or higher on a scale of 1-5. We exceeded this goal during the prior assessment cycle, with 90% of students achieving at least a 3 out 5 or greater. Therefore, the criterion for the upcoming cycle is that at least 80% of students will perform at an above average level (4/5) or higher, for each of the components within the three parts of the portfolio. The prior assessment cycle was the first cycle to report data as a percentage of students achieving the specified mark and serves as a benchmark for future assessment cycles.

Findings Description:

85% of students were able to complete 1) the linked-in profile correctly (photo and detailed professional description), 2) a cover letter, and 3) a career research narrative. 25% of students were not able to complete all three elements or completed all elements with one portion done partially or incorrectly.

RELATED ITEM LEVEL 3

1- AGRI 4120- Professional Employment Portfolio

2-Knowledge of Key Disciplinary Concepts and Skills

Goal Description:

Students will develop knowledge and skills relevant to agriculture communications and advocacy.

Providing Department: Agricultural Communication BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

2-Development of Students Knowledge and Skills

Learning Objective Description:

All students enrolled in the program will be able to demonstrate competency in key areas of professional communication skills and advocacy. Content knowledge along with written and oral communications will be important assessment skills.

RELATED ITEM LEVEL 2

2-ACOM 3360- Student Knowledge and Skills Development

Indicator Description:

All students enrolled in the degree program must complete ACOM 3360. This course addresses key oral skills with electronic presentation concepts and communication with writing skills relevant to the field of agriculture. A maximum of 10 ACOM students will be randomly selected. Should the available pool be fewer than 10 students, the specified assignment of all ACOM students enrolled in the specified course during the assessment period will be evaluated. The specified assignment will

be reviewed by faculty members with expertise in the field of agricultural communications. Faculty members will score the assignments using a scale of no evidence, inadequate evidence, adequate evidence, and outstanding evidence.

Attached Files

Oral_PresentationRubric - Original.pdf

Criterion Description:

It is the agreement of the Agricultural Sciences faculty that 80% of students will achieve a score of adequate evidence or outstanding evidence, on all areas assessed on the attached rubric.

Findings Description:

In the spring of 2024, 15/19 students achieved a 90% or better on their oral speech presentation skills as scored by hand and returned in person using the attached rubric. Students were able to speak clearly and confidently, present a presentation with minimal wording, have a well-organized and action-driven presentation. The 4 students who did not meet the criteria of an "A" showed evidence of a lack of confidence in oral presentation skills or did not meet the presentation requirements or did not have a well-articulated and organized presentation.

RELATED ITEM LEVEL 3

2-ACOM 3360-Student Knowledge and Skills Development

Action Description:

Students will be assessed via a rubric and by their instructor on their science communication abilities based on an informative presentation, a group persuasive speech presentation and discussion, and a written hard newsletter. The area of focus to be monitored is the students' ability to present factual information that is translated well enough and broken down for a non-scientific audience to understand.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

maintaining the current assessment methods and criteria for evaluating students' professional online identity, professional marketplace skills, and knowledge of key disciplinary concepts and skills, while deferring any modifications or improvements to the courses until the following year as per the new instructor's preference.

Update of Progress to the Previous Cycle's PCI:

Students will be assessed in public speaking skills using a public speaking rubric and no longer assessed based on Linked-in presence. Students will also be assessed in their science translation and writing skills using a hard news writing activity that is also scored using a rubric.

New Plan for Continuous Improvement Item

Closing Summary:

One element of the assessment will be removed (LinkedIn Profile) and two elements will be added (public speaking/science writing) to match the practicality of the agricultural communications profession.

Animal Science BS

Goal 1- Professional Marketplace Skills

Goal Description:

Students earning a BS in Animal Science will have the skills necessary to seek initial job placement as they begin their professional careers.

Providing Department: Animal Science BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Goal 1- Objective 1: Job Application and Interview Skills

Learning Objective Description:

Students will demonstrate job application and interview skills.

RELATED ITEM LEVEL 2

Goal 1- Objective 1. Indicator 1: Professional Employment Portfolio in AGRI 4120

Indicator Description:

This course focuses on essential skills vital for workforce entry, covering resume preparation, interview skills, technical writing, and job search strategies. During this assignment, students craft job application materials and respond to inquiries related to real animal science job openings curated by the faculty. These materials are compiled into a portfolio, with a total value of 100 points, comprising 20 points for the application, 35 points for the cover letter, and 45 points for the resume.

Criterion Description:

Building on the continued importance of professionalism in securing post-graduation employment, the criterion for the upcoming cycle is that a minimum of 70% of students achieve a proficiency level of 70% or higher for the portfolio as a whole. This adjustment eliminates the use of a rubric and streamlines the assessment process, emphasizing a holistic evaluation of students' portfolio performance.

Findings Description:

Out of the 53 students in the class 48 (or 90.5%) scored a 70% or higher in their portfolio submission.

RELATED ITEM LEVEL 3

Action 1.1.1 - Professional Employment Portfolio in AGRI 4120

Action Description:

Because 90% of students scored better than the goal set for the previous year, we would like to increase the goal for the coming year. This coming year we would like 70% of students to score 80% or higher on their portfolio.

RELATED ITEM LEVEL 2

Goal 1: Objective 1. Indicator 2: Phone and Face-to-Face Interviews in AGRI 4120

Indicator Description:

As part of AGRI 4120, a course mandatory for all Animal Science upperclassmen, students are required to undergo phone and face-to-face interviews with animal science faculty. Interview skills are evaluated by the faculty. Each interview carries a weight of 100 points.

Criterion Description:

Our expectation is that, during the assessment, a minimum of 70% of students will attain an average proficiency level of 70% or higher in their phone and face-to-face interviews. Recognizing areas for improvement from previous cycles, the goal remains consistent, reflecting our commitment to continually enhancing students' interview skills and overall professional development.

Findings Description:

Out of 53 students in the class, 51 (or 96%) scored a 70% or higher on both their face to face and phone interview.

RELATED ITEM LEVEL 3

Action 1.1.2 - Phone and Face-to-face Interviews in AGRI 4120

Action Description:

Because our students outperformed expectations with 96% scoring higher than a 70% on both their face to face and phone interview, for the coming year we will increase standards to 70% of the students scoring an 80% or higher on both their phone and face to face interviews.

RELATED ITEM LEVEL 1

Goal 1- Objective 2: Professional Online Identity

Learning Objective Description:

Students will develop a professional online identity.

RELATED ITEM LEVEL 2

Goal 1- Objective 2. Indicator 1: LinkedIn Profiles

Indicator Description:

All students seeking a degree in Animal Science are required to complete AGRI 4120 as upperclassmen. During the completion of this course all students must develop a professional online identity using LinkedIn.

Criterion Description:

Our expectation is that 70% of students will attain a proficiency level of at least 70% or higher on their LinkedIn profile assignment.

Findings Description:

Out of 53 students in the class, 43 (81%) scored at least a 70% or higher on their Linked In profile assignment.

RELATED ITEM LEVEL 3

Action 1.2.1 - LinkedIn Profiles

Action Description:

Because 81% of students scored a 70% or better we were able to reach our goal for the previous semester. As a result we wish to increase this goal to 80% of students scoring a 70% or higher on their LinkedIn assignment in the coming year.

Goal 2- Mastery of Key Disciplinary Knowledge

Goal Description:

Students will exhibit mastery of key disciplinary knowledge in animal science and animal production.

Providing Department: Animal Science BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Goal 2- Objective 1: Advanced Animal Science Knowledge

Learning Objective Description:

Students will develop factual and fundamental knowledge relative to the science of domestic livestock. Upon completion of the course, students will be able to apply the gained factual and fundamental knowledge relative to animal science and apply the information regarding animal nutrition and management.

RELATED ITEM LEVEL 2

Goal 2- Objective 1. Indicator 1: Assessment of Knowledge Mastery in ANSC 3373

Indicator Description:

All students enrolled in the Animal Science program must complete Animal Nutrition (ANSC 3373), an advanced animal science course that explores fundamental concepts of nutrition and management crucial to the field. This course imparts knowledge considered essential for all animal science graduates. The assessment methodology has shifted from embedded test questions to comprehensive assessments.

Criterion Description:

In light of recent changes, including the introduction of prerequisites (chemistry 1406 and a "C" or better in ANSC 1319), the assessment approach has transitioned. The objective is for a minimum of 70% of students to attain a proficiency level of 70% or higher in their assessments. This change reflects our commitment to a broader evaluation of student performance, moving away from specific question scores and aligning with evolving program requirements.

Findings Description:

In the 4 exams given in ANSC 3373 50% were able to score a 70% or higher on Exam I, 38% on Exam II, 53% on Exam III, and 60% on Exam IV. Only 24% of students were able to score a 70% or higher on all exams.

RELATED ITEM LEVEL 3

Action 2.1.1 Assessment of knowledge mastery in ANSC 3373

Action Description:

As no exams reached the 70% of students reaching a 70% or better, that will remain our goal for the coming year. Nutrition is a course where we expect difficultly due to subject matter, but we will look into ways to improve exam grades and therefore success rate of students in the course.

RELATED ITEM LEVEL 1

Goal 2: Objective 2- Application of advanced Animal Production Knowledge

Learning Objective Description:

Students will demonstrate mastery of application of advanced animal production knowledge that are necessary for working in the animal science industries.

RELATED ITEM LEVEL 2

Goal 2: Objective 2. Indicator 1- Ration Formulation in ANSC 4394

Indicator Description:

All students enrolled in the Animal Science program must complete Animal Feeds and Feeding (ANSC 4394), which is an advanced animal science course. This course applies knowledge from earlier animal science courses and requires students to develop diets for production livestock. Students will develop an industry standard 2-ingredient diet during an exam.

Criterion Description:

At least 70% of students will demonstrate the ability to correctly balance a 2-ingredient diet.

Findings Description:

Of the 111 students in Animal Feeds and Feeding (ANSC 4394), 80 (72%) were able to correctly balance a 2 ingredient diet.

RELATED ITEM LEVEL 3

Goal 2: Objective 2. Indicator 1- Ration Formulation in ANSC 4394

Action Description:

As 72% of students were able to correctly balance a 2-ingredient ration, we have just reached the goal of 70% of students set at the start of the year. While this is above the goal set, it is only slightly higher. For the coming year we will aim for 75% of students correctly balancing a 2-ingredient diet.

Update to Previous Cycle's Plan for Continuous Improvement

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

After reviewing the specific Goals/Objectives/Indicators of this program, the faculty in agriculture have determined that these items do not wholly reflect the needs and goals of our current students. As a result, we will reevaluate all Goals/Objectives/Indicators to better match the needs of our program and the students who are part of it. It is expected that this will require a deep look at what is considered success in this area and will likely cause significant change to the Goals/Objectives/Indicators for the coming academic year.

Update of Progress to the Previous Cycle's PCI:

The goals and objectives for the program were reworked this past year to better reflect the goals of the program. Now the focus is on both knowledge gain in key courses in the program as well as the soft skills of students such as presentation and interviewing skills. These assessments better focus on student completing their degree and being work force ready at the completion of their degree.

New Plan for Continuous Improvement

Closing Summary:

In some areas student beat expectations (presentation in 4120 and ration balancing) however they still fell short in regards to their performance in Nutrition. As a result we have raised expectations in the areas we have been successful in and will determine ways to improve student performance in our more difficult courses.

Interdisciplinary Agriculture BS

1. Goal 1 (Workplace Readiness) - Ag Science Teacher Placement

Goal Description:

Students earning a BS in Interdisciplinary Agriculture will develop the skills necessary to seek initial job placement as they begin their professional careers as teachers.

Providing Department: Interdisciplinary Agriculture BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

1. Goal 1 (Workplace Readiness) Objective 1 (Content Exam)

Learning Objective Description:

Interdisciplinary Agricultural students will demonstrate their workplace readiness by obtaining employment as AFNR teachers.

RELATED ITEM LEVEL 2

1. Goal 1 (Workplace Readiness) Objective 1 - Indicator 1 (Content Exam)

Indicator Description:

Interdisciplinary Agricultural (Teacher Certification) students apply and interview for AFNR teaching positions at the conclusion of their Educator Preparation Program (EPP). Employment as an AFNR teacher (in the two semesters following student teaching) will be the area of focus for this indicator. The indicator will be assessed by direct measures (i.e., we communicate with our graduates after they have completed the EPP). The following rubric will be used to assess this indicator:

- Employed as an AFNR Teacher within 1 year of completing EPP: **Indicator Met**
- Not Employed as an AFNR Teacher within 1 year of completing EPP: **Indicator Not Met**

Criterion Description:

Our expectation is that 80% of our Interdisciplinary Agricultural (Teacher Certification) students will obtain employment as an AFNR teacher within a year following graduation. The criterion was set at 80% to account for the graduates who decide not to pursue teaching careers and those who are unable to find employment as teachers. The criterion was set based on the One-Year Employment of Certified Teachers data for the EPP at SHSU over the past 4 years (Texas Education Agency, n.d.).

Findings Description:

Of the 30 student teachers that we had this year (12 in Fall 23 & 18 in Spring 24), 20 students have been placed at high school teaching jobs or at graduate school-yielding a 69.25% placement rate.

Fall 23 (n = 12) - 83% placement rate:

Employed as teacher: 9

Looking for teaching position: 1

Graduate School placement: 1

Not graduated from SHSU at this time: 1

Spring 24 (n = 18) - 55.5% placement rate:

Employed as teacher: 8

Looking for teaching position: 7

Graduate School placement: 2

Not pursuing a teaching position: 1

The findings for this indicator fell below the predicted value. While we still have 8 students seeking employment as teachers, we had a total of 3 students who pursued graduate education which lowered the employment percentage. For the upcoming year, we look to determine better practices for placing students in a timely manner.

RELATED ITEM LEVEL 3

Action - 1.1.1: Content Exam
Action Description:
As explained in the findings of the associated indicator, we failed to obtain a 75% employment rate for

The findings for this indicator fell below the predicted value. While we still have 8 students seeking employment as teachers, we had a total of 3 students who pursued graduate education which lowered the employment percentage. For the upcoming year, we look to determine better practices for placing students in a timely manner.

To enhance the placement rate, we aim to:

- Evaluate the student teaching curriculum to determine if there are any gaps in our training on the interview process.
    - Welcome hiring school districts to host on-campus interviews for students in the teaching block.
- Assess the placement rate of teachers in August to receive a more accurate account of the placement rate (many teachers are still interviewing for positions over the summer).

2. Goal 2 (Knowledge) (Content Knowledge in AFNR)

Goal Description:
Students in Interdisciplinary Agriculture will be provided with a holistic educational experience in various AFNR contexts (e.g., Ag Business, Ag Engineering, Animal Science, Plant Science, Wildlife and Ecology, etc.).

Providing Department: Interdisciplinary Agriculture BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

2. Goal 2 (Knowledge) Objective 1 (Content Knowledge in AFNR)
Learning Objective Description:
Interdisciplinary Agriculture (Teacher Certification Students) will develop knowledge and skills relevant to Agricultural Education and Pedagogy.

RELATED ITEM LEVEL 2

2. Goal 2 (Knowledge) Objective 1 - Indicator 1 (TExES 272 AFNR Content Exam)
Indicator Description:
Students in the Educator Preparation Program become fully certified teachers when they finish up the teacher preparation coursework and take the TExES 272 AFNR Content Exam. This exam is generally taken in the first semester of their Senior year of coursework. The exam encompasses questions related Ag Business, Ag Engineering, Animal Science, Plant Science, and Wildlife and Ecology. The students must obtain a minimal score of 242 (out of 300) to pass the exam.

Criterion Description:

Our expectation is that 85% of the Interdisciplinary Agriculture (Teacher Certification) students will pass the TExES 272 AFNR Content Exam (i.e., score of ≥ 240) on their first attempt of taking the exam. The Texas Educator Certification Examination Program Pass Rate Report (Texas Education Agency, 2022) served as a guide to determine our benchmark.

Findings Description:

In the 23-24 school year, all senior students in our EPP passed the TExES content exam. Of the 30 student teachers that we had this year (12 in Fall 23 & 18 in Spring 24), 30 students passed the AFNR 272 on their first attempt. The students success at passing the content exam surpassed our expectation of 85%. To continue this success, we will continue to provide a holistic content exam review for our students. Our goals and indicators related to the content exam will remain the same for the next year.

RELATED ITEM LEVEL 3

Action 2.1.1 TExES 272 AFNR Content Exam

Action Description:

Based on the findings, the indicator 2.1.1 was met. To continue this success, we will continue to provide a holistic content exam review for our students. Our goals and indicators related to the content exam will remain the same for the next year. However, we will reinforce this effort by reinforcing our preparation efforts. Specifically, we will:

Actions:

- Identify materials and resources available to enhance our students success on the TExES exam.
- Encourage students to evaluate available assessments on Quizlet and other test preparation websites.

RELATED ITEM LEVEL 2

2. Goal 2 (Knowledge) Objective 1 - Indicator 2 (Pedagogy and Professional Responsibilities EC–12 (160))

Indicator Description:

Students in the Educator Preparation Program become fully certified teachers when they finish up the teacher preparation coursework and pass the Pedagogy and Professional Responsibilities EC–12 (160) (PPR) Exam. Every Interdisciplinary Agriculture (Teacher Certification) student takes this exam during their last semester while enrolled in the student teaching block. exam tests the applicant's knowledge and skills to be an entry-level teacher in Texas public schools (TExEStest.org, n.d.). Specifically the test assesses the teacher candidate's knowledge associated with the following domains: 1) Designing instruction and assessment to promote student learning, 2) creating a positive, productive classroom environment, 3) implementing effective, responsive instruction and assessment, and 4) fulfilling roles and responsibilities.

The TExES PPR exam is converted into a scaled score ranging from 100-300 points. Candidates must score at least a 240 to pass. The Interdisciplinary Agriculture (Teacher Certification) students take the PPR at various testing centers, and the scores are sent to the SHSU EPP which the Ag Teacher Educators have access to. These scores will be used as a direct measure of our students' competency of pedagogy and professional responsibilities needed for teaching. Students will be evaluated based on the following criteria:

- **Student scores ≥ 240 points on the PPR Exam = Indicator Met**
- **Student scores < 240 points on the PPR Exam = Indicator Not Met**

Criterion Description:

Our expectation is that 85% of the Interdisciplinary Agriculture (Teacher Certification) students will pass the PPR exam (i.e., score of ≥ 240) on their first attempt of taking the exam. The Texas Educator Certification Examination Program Pass Rate Report (Texas Education Agency, 2022) served as a guide to determine our benchmark.

Findings Description:

In the 23-24 school year, 16 of the senior-level teacher certification students passed the PPR exam (N = 30; 12 in Fall 23 & 18 in Spring 24) - yielding a 53.3% completion rate.. The pass rate at this current point sits at 53.3%, falling short of the indicator. While, we did not meet the indicator, we still have students taking the PPR to complete their teaching certifications.

RELATED ITEM LEVEL 3

Action 2.1.2 - Pedagogy and Professional Responsibilities EC-12

Action Description:

In the 23-24 school year, 16 of the senior-level teacher certification students passed the PPR exam (N = 30; 12 in Fall 23 & 18 in Spring 24). The pass rate at this current point sits at 53.3%, falling short of the indicator. While, we did not meet the indicator, we still have students taking the PPR to complete their teaching certifications.

Action Items:

- Assess PPR success rate later in the summer. Student teachers can take this exam after completing their field placement. Extended time would allow for a more accurate measurement.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The plan for continuous improvement in the Interdisciplinary Agriculture program includes evaluating students' professional online identity through LinkedIn profiles and setting a benchmark of 70% of students achieving a score of 3 or higher. Additionally, the plan aims to enhance students' professional marketplace skills by assessing their performance in AGRI 4120 using a portfolio review and rubric, with a target of 80% of students performing at an above-average level. The program also focuses on assessing students' knowledge and skills development in areas such as presentation and communication through ACOM 3360, aiming for a minimum of 80% achievement.

Update of Progress to the Previous Cycle's PCI:

We will adjust the Previous Cycle's PCI. The plan for continuous improvement in the Interdisciplinary Agriculture program includes evaluating students' knowledge (as assessed by their completion of the TExES 272 and PPR exams) and workplace readiness (as assessed by the teacher placement rate). Therefore, I do not have a progress update for the previous cycle's PCI.

New Plan for Continuous Improvement Item

Closing Summary:

The plan for continuous improvement in the Interdisciplinary Agriculture program will include evaluating students' knowledge (as assessed by their completion of the TExES 272 and PPR exams) and workplace readiness (as assessed by the teacher placement rate). We will attempt to assess the placement rates and passing rates on the test later in the summer. Also, we will seek to find innovative resources to supplement our students preparation process for the TExES 272 exam.

Department of Biological Sciences

Biology BA/BS

G1: Improve Student Scientific Literacy Skills

Goal Description:

Students completing an undergraduate degree in Biology will demonstrate scientific literacy skills.

Providing Department: Biology BA/BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G1LO1: Select and Implement an Assessment of Scientific Literacy Skills

Learning Objective Description:

A committee of stakeholders (i.e. faculty, lab supervisors, instructors) will evaluate and select a scientific literacy assessment. The committee will integrate the skills and assessment into appropriate courses and curriculum. Practitioners will implement the scientific literacy assessment in both an introductory course and a shared upper-level course to gather data.

RELATED ITEM LEVEL 2

G1LO1I1: Select and implement an Assessment of Scientific Literacy Skills

Indicator Description:

List of possible scientific literacy assessments.

Develop analysis plan (stats and criteria for future years)

Criterion Description:

The development of the list of scientific literacy assessments and the analysis plan will be completed by the und of July 2024.

Findings Description:

The committee is currently still evaluating different assessments over the summer and will make a decision by August 1.

RELATED ITEM LEVEL 3

Action - G1LO1I1: Select and implement an Assessment of Scientific Literacy Skills

Action Description:

Select and implement an assessment tool by Aug 2024.

G2: Demonstrate Mastery of Core Concepts in the Field of Biology

Goal Description:

Students completing the core courses required for a BS will demonstrate knowledge of core concepts of cell biology, biodiversity, genetics and evolution.

Providing Department: Biology BA/BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Mastery Of Core Curriculum

Learning Objective Description:

Students completing the core courses required for a BS will demonstrate knowledge of core concepts of cell biology, biodiversity, genetics and evolution.

RELATED ITEM LEVEL 2

Mastery of Core Curriculum

Indicator Description:

All students, regardless of concentration area, take the same core courses (BIOL 1406, BIOL 1407, BIOL 3450, and BIOL 4361). Faculty teaching each of these courses will agree on a set of embedded questions to include on the final exam. Students will correctly answer these embedded questions.

Criterion Description:

Students will score 70% on the embedded questions.

Findings Description:

The list of embedded questions is still being formulated for the selected courses. However, The DFQW rate for the upper level courses (where the students should show mastery of core concepts is quite low, especially compared to the lower level courses.

RELATED ITEM LEVEL 3

Mastery of Core Curriculum

Action Description:

Complete the process of embedding standard questions into the listed courses and collect data.

G3: Student Engagement in Undergraduate Research

Goal Description:

Students will engage in the process of scientific discovery by participating in faculty mentored research.

Providing Department: Biology BA/BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Student Engagement in Undergraduate Research

Learning Objective Description:

Students will engage in the process of scientific discovery by participating in faculty mentored research.

RELATED ITEM LEVEL 2

Undergraduate Research

Indicator Description:

Students will enroll in BIOL 4095: Undergraduate Research Topics and participate directly in faculty mentored biological research, with the goal of producing publishable research and/or quality research that can be presented at scientific conferences.

Criterion Description:

50% of each graduating class will enroll in BIOL 4095. Using the departmental Faculty Evaluation Instrument, that in part documents faculty engagement with undergraduate researchers, the department chair will track the number of peer-reviewed publications and presentations at scientific conference on which our undergraduate students appear on the author line.

Findings Description:

We had 30 students complete the BIOL 4095 course with another 56 students conducting independent research but not for course credits. Between fall and spring semesters, we graduated about 120 undergraduate majors. While fell short of the 50% of the graduating class enrolling in 4095, a majority of our students did conduct research, to some degree.

RELATED ITEM LEVEL 3

Undergraduate Research

Action Description:

Work to encourage undergraduates to enroll in 4095.

G4: Improve Undergraduate Laboratory Data Collection and Communication

Goal Description:

Undergraduate STEM students apply skills/knowledge from lecture in application-based laboratories. We must have a base-line for lab impact/influence on student outcomes in order to improve it. The goal is to identify areas for improvement in subsequent semesters.

Providing Department: Biology BA/BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G4LO1: Improve undergraduate laboratory data collection and communication

Learning Objective Description:

A committee of practitioners will evaluate data collection platforms and decide which data to share.

RELATED ITEM LEVEL 2

G4LO1I1 Improve undergraduate laboratory data collection and communication

Indicator Description:

A committee of practitioners will evaluate data collection platforms. The indicators will be a list of protocols.

Criterion Description:

A list of protocols will be generated and a final protocol will be chosen.

Findings Description:

The committee has decided to use excel as the platform to collect and store data with graduate students (supported by Steven Koether's grant) to collect and enter data from each of lab coordinator.

RELATED ITEM LEVEL 3

Action - G4LO1I1 Improve undergraduate laboratory data collection and communication

Action Description:

Implement the data collection and analyze results from this past year.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

We did not hit the benchmarks for this degree plan. We will continue to investigate strategies on improving each of the metrics for the degree plan.

Update of Progress to the Previous Cycle's PCI:

We have spent the past year working to improve our benchmarks (which we have). We will continue these efforts moving forward.

New Plan for Continuous Improvement Item

Closing Summary:

We did not hit all or our benchmarks for this past year but have improved over previous years. We will continue to work to improve this numbers.

Biology MS

Deliver A Curriculum with Appropriate Sub-Discipline Specific Knowledge

Goal Description:

Students will learn the advanced knowledge and skills appropriate to the sub-discipline of biology they have chosen to pursue (e.g. evolutionary biology, cell/molecular biology, microbiology, taxonomy/systematics).

Providing Department: Biology MS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Knowledge and Skills appropriate to biological subdiscipline

Learning Objective Description:

1. Each student will demonstrate the ability to communicate knowledge and skills appropriate to the biological subdiscipline they have chosen to study.
2. Students will acquire knowledge and skill sets that will make them competitive in the job market or to move on to a Ph.D. program.

RELATED ITEM LEVEL 2

Oral Comprehensive Exam

Indicator Description:

All graduate students will demonstrate a mastery of the knowledge and skills appropriate to biological subdiscipline they have chosen through an oral graduate comprehensive examination, administered by their thesis advisory committee. The thesis advisory committee will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area.

Criterion Description:

Each student needs to earn at least a "Pass" mark in each examined area to pass the oral comprehensive exam. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

We had 14 students take their oral exams this past year. All students passed on their first attempt.

RELATED ITEM LEVEL 3

Oral Comprehensive Exam

Action Description:

Continue monitoring the pass rate for the comprehensive exam.

RELATED ITEM LEVEL 2

Publication Rate

Indicator Description:

Each student's publication record will be tracked throughout the MS degree.

Criterion Description:

The number of papers published following the MS graduation will be compared to number published when admitted into the program. An increase in publications over this time will indicate the student has learned about the process through direct experience.

Findings Description:

Of the 10 M.S. students who graduated, two have publications at the time of their graduation.

RELATED ITEM LEVEL 3

Publication Rate

Action Description:

Look for ways to increases publication rates prior to graduation.

Quality Research

Goal Description:

Students will produce quality, publishable research.

Providing Department: Biology MS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Knowledge and Skills of the Scientific Process

Learning Objective Description:

Students will engage in the scientific process from the development of a research question, through experimental design and analysis of results, to final dissemination through peer-reviewed publication and/or presentation at scientific conferences.

RELATED ITEM LEVEL 2

Production and Presentation of a Publishable Thesis

Indicator Description:

Students will continue to engage in the scientific process by taking two “thesis” courses in the second year of their master’s program. During this time they will conduct their research, analyze their results, and write and publicly defend a publishable thesis.

Criterion Description:

The graduate coordinator will track how many students present their thesis results at scientific conferences and how many students publish their thesis results in peer-reviewed scientific journals. Faculty expect that 80% of graduating master’s students will have either presented or published.

Findings Description:

We had 10 graduate students this past year with 9 out of the 10 either publishing or presenting their thesis.

RELATED ITEM LEVEL 3

Production and Presentation of a Publishable Thesis

Action Description:

Continue to monitor the number of publications and presentations.

RELATED ITEM LEVEL 2

Production of Quality Thesis Proposal

Indicator Description:

Students are expected to produce a quality thesis proposal by the end of their second semester. To ensure this students take BIOL 5302 and are required to have a approved proposal by the end of the semester.

Criterion Description:

Each student needs to earn at least a B in each seminar course to proceed in the program. Faculty expect that 80% of graduate students will meet this requirement.

Findings Description:

Thirteen total students were registered for BIOL 5302 over the past year. 12 earn an A; 1 earned an F.

RELATED ITEM LEVEL 3

Production of Quality Thesis Proposal

Action Description:

Continue to monitor the number of students who successfully pass BIOL 5302. Look for ways to make sure all students admitted into the program pass.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

We will continue to track graduate student success as we have hit all benchmarks for the past year.

Update of Progress to the Previous Cycle's PCI:

We have continued to hit most of the benchmarks this past year.

New Plan for Continuous Improvement Item

Closing Summary:

We have hit most benchmarks for the past year. We will look for ways to increase the number of publications for our MS. students.

Biomedical Sciences BS

Demonstrate Mastery in Core Concepts in the Fields of Biology and Biomedical Sciences

Goal Description:

Students completing the core courses required for a BS will demonstrate knowledge of core concepts of cell biology, biodiversity, genetics and evolution.

Providing Department: Biomedical Sciences BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Mastery Of Core Curriculum
Learning Objective Description:

Students completing the core courses required for a BS will demonstrate knowledge of core concepts of cell biology, biodiversity, genetics and evolution.

RELATED ITEM LEVEL 2

Mastery of Core Curriculum
Indicator Description:

All students, regardless of concentration area, take the same core courses (BIOL 1406, BIOL 1407, BIOL 3450, and BIOL 4361). Faculty teaching each of these courses will agree on a set of embedded questions to include on the final exam. Students will correctly answer these embedded questions.

Criterion Description:

Students will score 70% on the embedded questions.

Findings Description:

The list of embedded questions is still being formulated for the selected courses. However, the DFQW rate for the upper level courses (where the students should show mastery of core concepts is quite low, especially compared to the lower level courses.

RELATED ITEM LEVEL 3

Mastery of Core Curriculum
Action Description:

Complete the process of embedding standard questions into the listed courses and collect data

G1: Improve Student Scientific Literacy Skills

Goal Description:

Students completing an undergraduate degree in Biomedical Sciences will demonstrate scientific literacy skills.

Providing Department: Biomedical Sciences BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G1LO1: Select and Implement an Assessment of Scientific Literacy Skills.
Learning Objective Description:

A committee of stakeholders will evaluate and select a scientific literacy assessment

RELATED ITEM LEVEL 2

G1LO1I1: Select and implement an Assessment of Scientific Literacy Skills

Indicator Description:

List of possible scientific literacy assessments.

Develop analysis plan (stats and criteria for future years)

Criterion Description:

The development of the list of scientific literacy assessments and the analysis plan will be completed by the und of July 2024.

Findings Description:

The committee is currently still evaluating different assessments over the summer and will make a decision by August 1.

RELATED ITEM LEVEL 3

Action - G1LO1I1: Select and implement an Assessment of Scientific Literacy Skills

Action Description:

Select and implement an assessment tool by Aug 2024.

Student Engagement in Undergraduate Research

Goal Description:

Students will engage in the process of scientific discovery by participating in faculty mentored research.

Providing Department: Biomedical Sciences BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Undergraduate Research

Learning Objective Description:

Students will engage in the process of scientific discovery by participating in faculty mentored research.

RELATED ITEM LEVEL 2

Undergraduate Research

Indicator Description:

Students will enroll in BIOL 4095: Undergraduate Research Topics and participate directly in faculty mentored biological research, with the goal of producing publishable research and/or quality research that can be presented at scientific conferences.

Criterion Description:

50% of each graduating class will have enrolled in BIOL 4095 . Using the departmental Faculty Evaluation Instrument, that tracks faculty engagement with undergraduate researchers, the department chair will track the number of peer-reviewed publications and presentations at scientific conference on which our undergraduate students appear on the author line.

Findings Description:

We had 30 students complete the BIOL 4095 course with another 56 students conducting independent research but not for course credit. Between fall and spring semesters, we graduated about 120 undergraduate majors. While we fell short of the 50% of the graduating class enrolling in 4095, a majority of our students did conduct research.

RELATED ITEM LEVEL 3

Undergraduate Research

Action Description:

Work to encourage students to enroll in 4095.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

We did not hit the benchmarks for this degree plan. We will continue to investigate strategies on improving each of the metrics for the degree plan.

Update of Progress to the Previous Cycle's PCI:

We did not meet all benchmarks this past year but did improve over last year.

New Plan for Continuous Improvement Item

Closing Summary:

We did not hit all of our benchmarks this past year but have improved over the previous year. We will continue to work to improve this number.

Department of Chemistry

Chemistry BS

Goal 1: Establishing a Robust Foundation in Core Chemistry Principles and Techniques

Goal Description:

In our Chemistry program at Sam Houston State University, we are committed to ensuring that students not only gain but also retain comprehensive foundational knowledge and practical skills in key areas of chemistry, essential for both academic and professional success. This goal encompasses a deep understanding of General Chemistry, Organic Chemistry, and Quantitative Analysis, as these areas form the cornerstone of chemical education and are vital for a wide range of scientific careers. These courses are required in the Chemistry and Forensic Chemistry majors and are normally taken in the first two years (for full descriptions see http://catalog.shsu.edu/undergraduate/course-descriptions/chem/ and for the main degree plans see http://catalog.shsu.edu/undergraduate/colleges-academic-departments/science-and-engineering-technology/chemistry/#programstext):

- CHEM 1411 General Chemistry I
- CHEM 1412 General Chemistry II
- CHEM 2323+2123 Organic Chemistry I Lecture and Laboratory
- CHEM 2325+2125 Organic Chemistry II Lecture and Laboratory
- CHEM 2401 Quantitative Analysis

General Chemistry lays the foundational bedrock, providing students with an in-depth understanding of chemical reactions, atomic and molecular structures, and thermodynamics. It serves as the gateway for appreciating the complexity and beauty of chemistry.

Organic Chemistry advances this knowledge by delving into the intricate world of carbon-based compounds, fostering skills in molecular synthesis, and understanding chemical properties and reactions that are central to biological, pharmaceutical, and industrial applications.

Quantitative Analysis equips students with crucial analytical and data interpretation skills, emphasizing accuracy, precision, and problem-solving techniques. These skills are not only fundamental in chemistry but also translate across various scientific disciplines, enhancing the students' ability to tackle complex real-world problems.

Additionally, this goal stresses the importance of integrating theoretical knowledge with practical applications. Through laboratory courses and research opportunities, students apply concepts learned in the classroom to real-life scenarios, thus solidifying their understanding and preparing them for the challenges of scientific careers and advanced study.

Our curriculum aligns with the highest standards set by professional bodies like the American Chemical Society, ensuring that our graduates are well-prepared for the demands of the job market and further academic pursuits. We also emphasize the development of critical thinking and analytical skills, fostering a culture of inquiry and innovation.

Furthermore, we recognize the interdisciplinary nature of modern scientific problems. Our program encourages students to understand and apply chemistry principles to fields such as biochemistry, environmental science, forensic chemistry, and material science, reflecting the versatile and interconnected nature of the discipline.

Finally, we aim to instill in our students a commitment to continuous learning and professional development. In an ever-evolving scientific landscape, the ability to adapt and grow is crucial. We prepare our students to be lifelong learners, ready to contribute meaningfully to the scientific community and

society at large. The foundational knowledge obtained in this set of courses allows students to form a solid common foundation in the field of chemistry from which to launch into specialized fields like biochemistry, physical chemistry, inorganic chemistry, and polymer chemistry in their advanced undergraduate studies.

Providing Department: Chemistry BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Achieve Proficient Comprehension in Fundamental Organic Chemistry Concepts and Skills

Learning Objective Description:

Students will achieve a proficient comprehension of fundamental concepts in Organic Chemistry, a crucial subfield of chemistry. This objective is centered around the knowledge and skills acquired in the second-year series of Organic Chemistry courses (CHEM 2323/2123/2325/2125). Key components of this learning objective include:

1. **Understanding of Core Organic Chemistry Principles**: Students will develop a thorough understanding of fundamental organic chemistry concepts, including molecular structure, bonding theories, stereochemistry, and the properties of various organic compounds.
2. **Mechanisms of Organic Reactions**: Mastery in comprehending and predicting the mechanisms of organic reactions is essential. This includes understanding reaction kinetics, reaction types, and the factors influencing these reactions.
3. **Synthesis and Analysis of Organic Compounds**: Students will learn the principles and techniques for the synthesis of organic compounds. This includes knowledge of reagents, reaction conditions, and purification methods, along with skills in analyzing and identifying compounds using spectroscopic techniques.
4. **Application of Organic Chemistry in Real-World Contexts**: Students should be able to apply their knowledge to solve practical problems in organic chemistry. This could include case studies, laboratory experiments, or problem-solving exercises that demonstrate their ability to apply organic chemistry concepts in practical scenarios.
5. **Safety and Best Practices in Organic Laboratory Work**: An understanding of and adherence to safety protocols and best practices in handling organic compounds and conducting experiments is crucial.
6. **Integration of Theoretical Knowledge and Practical Skills**: Students are expected to integrate theoretical knowledge from lectures with practical laboratory skills. This includes performing experiments, analyzing results, and understanding the practical implications of theoretical concepts.

Through achieving these outcomes, students will not only grasp the fundamental concepts of Organic Chemistry but also be able to apply this knowledge effectively in both academic and professional settings. This solid foundation in Organic Chemistry is crucial for their success in advanced studies and various careers in the chemical sciences.

RELATED ITEM LEVEL 2

Proficiency Assessment in Organic Chemistry for CHEM 3438 Biochemistry I

Indicator Description:

In the initial weeks of the CHEM 3438 Biochemistry I course, all students will participate in a specialized Organic Chemistry test. This assessment, authored by Dr. Haines who teaches Biochemistry and used to teach Organic Chemistry II regularly, is specifically designed to focus on

aspects of Organic Chemistry that are most relevant to the Biochemistry curriculum. The test will be administered during laboratory sessions within the first two weeks of the course. A copy of the test to be given is attached.

The primary objectives of this assessment are:

1. **Diagnosis of Prerequisite Knowledge**: Given that Organic Chemistry I and II are prerequisites for Biochemistry I, the test will serve as an essential tool to evaluate students' foundational knowledge in Organic Chemistry. This is particularly crucial as a strong understanding of Organic Chemistry is imperative for grasping the chemistry and properties of biological molecules, a key component in Biochemistry.

2. **Assessment of Knowledge Retention**: This test will also measure the retention of Organic Chemistry concepts learned in the second year of the students' chemistry coursework. It aims to identify the extent to which key concepts have been retained and understood, which is vital for the successful study of Biochemistry.

The test content will encompass critical areas of Organic Chemistry such as molecular structure, reaction mechanisms, synthesis, and analysis of organic compounds, ensuring a comprehensive review of the subject matter. The results from this test will provide valuable insights into the students' preparedness for advanced biochemical studies and will help identify areas where additional instructional support or review is necessary.

Attached Files

CHEM3438 F2023 Prereq Test Organic Chemistry.pdf

Criterion Description:

In the previous year an American Chemical Society standardized test was employed with the criterion that seventy-five percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized organic chemistry examination. The nationally normed mean on the ACS Organic test used was 36.6 +/- 11.4 questions correct, so the threshold used was 36.6-11.4 = 25.2 questions correct. The nearest whole number above 25.2 is 26, so that was the required score students had to achieve. Of the three sections of Biochemistry Lab in Spring 2023, 6/16, 8/23, and 1/22 students scored 26 or higher out of 50 for a total of 15/71 students. Only 21% of students earned the expected score, so the criterion was far from being met. Two issues were observed: 1) Students may not have taken the exam seriously, as it did not directly calculate as part of their grade, but a low score triggered mandatory review activities. 2) Students who took some prerequisite chemistry (Organic Chem) at community college appear to score particularly low on the exam.

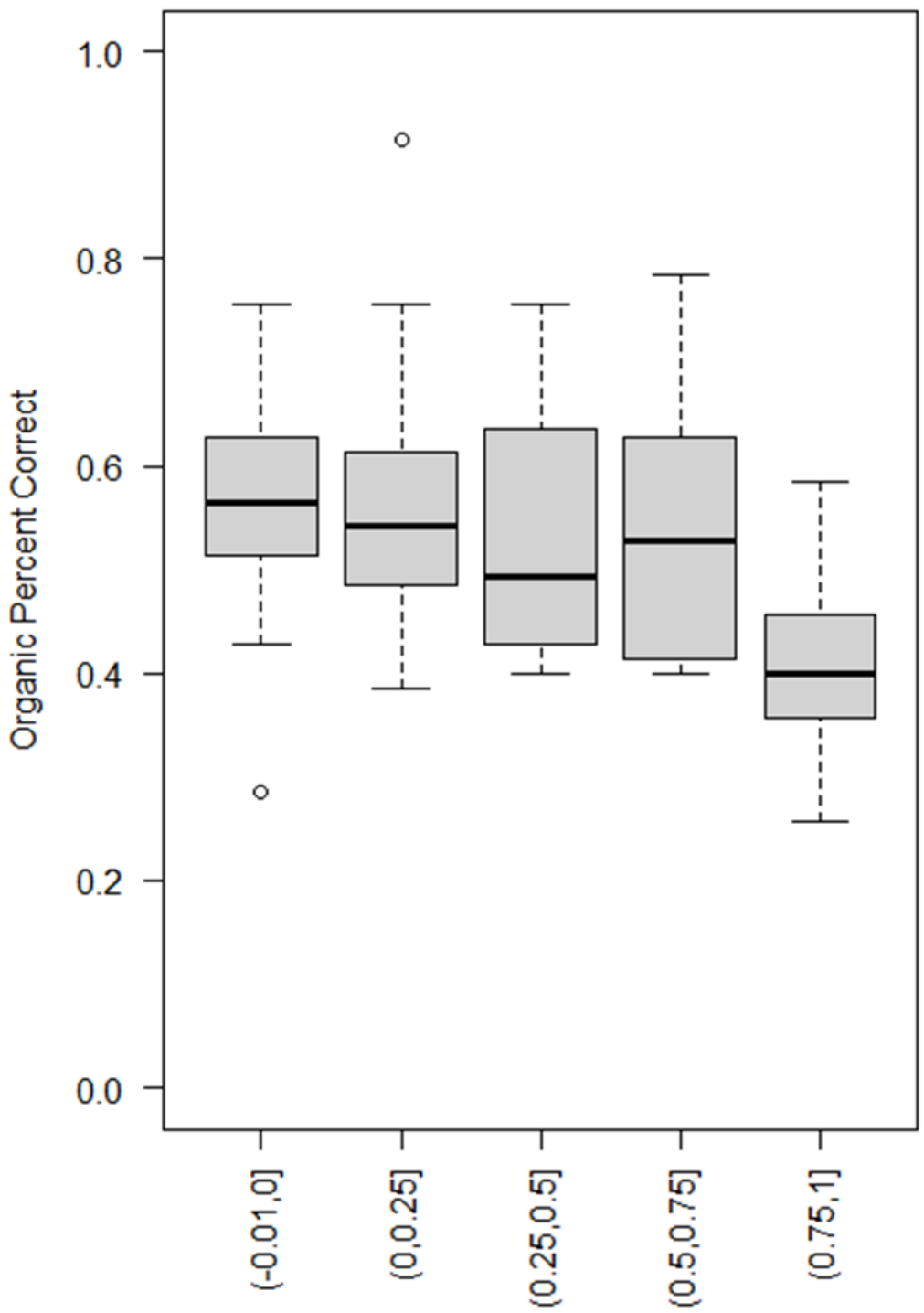
For the current year, an exam that focused more on the part of Organic Chemistry most relevant to Biochemistry was desired for reasons having to do with course pedagogy. This new custom-written exam has not been normed. Therefore, the criterion will be that at least 75% of students score a 'passing' grade of at least a C, designated by a numerical score of at least 70 out of 100 points on the exam. Due to the transfer issues noted above, only students that took at least 3 of 4 prerequisite chemistry lecture courses at SHSU will be included in the analysis this year, with other students (including transfer students) left to assess in a later cycle.

Findings Description:

For the exam given in Fall 2023, 78 students were assessed. Of those, 24 had taken all prerequisites at SHSU, and 13 had taken 3 of 4 prerequisites at SHSU. The statistical distribution of scores (as a quantile analysis in the statistical package R) was:

Percent of Prereqs at SHSU	minimum score	25-percentile	median	mean	standard deviation	75-percentile	maximum score	count
100%	28.6%	51.4%	56.4%	56.1%	9.9%	62.9%	75.7%	24
75%-99%	38.6%	48.6%	54.3%	57.0%	15.3%	61.4%	91.4%	13
50%-74%	40.0%	42.9%	49.3%	52.7%	11.3%	63.2%	75.7%	20
25%-49%	40.0%	41.4%	52.9%	54.0%	13.0%	62.9%	78.6%	10
0%-24%	25.7%	35.7%	40.0%	40.5%	9.4%	45.7%	58.6%	11

A boxplot of the data shows a clear trend downward as percent of prereqs taken elsewhere increases:



From this data, it can be seen that

- Even if only the students with 75% and 100% of prereqs at SHSU are considered, the median score was only around 56% which is well short of the 70% criterion. Even considering the 75%-ile (top 25% of students), the scores only reach about 62%, but considering the top 3/4 of students as indicated in the criterion results in an exam score of only about 50%. Therefore, the findings are not even close to the criterion.
- As predicted, there is a major difference in score when comparing students who took all or most prerequisites at SHSU to those who took all or most prerequisites at other schools (almost always at community college). The median score is 56% for those from SHSU versus 40% for

those who took all prerequisites elsewhere, and the 25th-percentile scores (3/4 of students) for the two groups are 51% versus 36%. There is a consistent difference of roughly 16% between the two groups.

RELATED ITEM LEVEL 3

Action - Proficiency Assessment in Organic Chemistry for CHEM 3438 Biochemistry I

Action Description:

The criterion was not met, it wasn't even close. For all student groups examined, knowledge of Organic Chemistry in this post-Organic course severely lags behind the expected knowledge level. This assessment alone cannot determine if the issue is that students never learned the material or if they originally learned it and then lost that knowledge. Both components are likely at play.

To address this serious problem, the following actions will be taken:

1. Dr. Haines, the CHEM 3438 lab instructor, will Increase the required review of Organic Chemistry at the beginning of CHEM 3438 lab where this assessment is carried out. These reviews are carried out in Blackboard Modules. These modules will be expanded for Fall 2024.
2. Results will be discussed with Organic instructors and our support partners (Academic Success Center tutor leaders, etc.) to raise awareness of the issue and discuss what supports may be useful.
3. Dr. Haines will lead a faculty and staff discussion of the issue in Fall 2024 to determine if additional assessment and correction are appropriate. For example, a mandatory 1 credit hour course for majors in the department could be added during the junior year that more thoroughly assesses this knowledge (along with knowledge of General Chemistry) followed by mandatory corrective actions for those that whose knowledge and skills do not meet standards. The pedagogical benefit must be weighed against the increased credit hours and cost, as well as consideration of what happens to students that fail to reach those standards even by the end of the course.

RELATED ITEM LEVEL 2

American Chemical Society Standardized Organic Chemistry Final Examination in CHEM 2325

Indicator Description:

t the conclusion of the CHEM 2325 Organic Chemistry II course at Sam Houston State University, all chemistry majors will undertake the ACS Organic Chemistry Test. This test, developed by the American Chemical Society Division of Chemical Education Examinations Institute, is a nationally standardized assessment and will serve as the final examination for the course.

The primary purpose of this assessment is:

1. **Comprehensive Evaluation of Organic Chemistry Knowledge**: The test is designed to comprehensively evaluate the students' understanding and mastery of Organic Chemistry. It covers a broad range of topics integral to the subject, ensuring a thorough assessment of the students' knowledge and skills acquired throughout the course.

2. **Standardized Benchmarking**: By using a nationally standardized test, the examination provides a reliable benchmark to measure students' performance against national standards. This helps in evaluating the effectiveness of the Organic Chemistry II course at Sam Houston State University in comparison to similar programs nationwide.

3. **Identification of Learning Outcomes**: The results from this test will offer valuable insights into the areas where students excel and where they may need further improvement. This information is critical for curriculum development and instructional strategies, aiming to enhance the overall quality of the Organic Chemistry program.
4. **Preparation for Advanced Studies and Professional Exams**: This standardized test also serves to prepare students for future professional and academic pursuits that require a solid foundation in Organic Chemistry, including advanced studies and professional certification exams.

The content of the test encompasses key topics in Organic Chemistry such as reaction mechanisms, synthesis, identification and analysis of organic compounds, and molecular structure, among others. The results will be analyzed to understand the efficacy of the teaching methods and the curriculum in imparting the necessary knowledge and skills in Organic Chemistry.

Criterion Description:

In the previous year, the criterion was that seventy-five percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized organic chemistry examination. The ACS Organic exam had a normed average of 36.6 +/- 11.4 out of 70 questions (scores ranged from 17-57), so one standard deviation below the mean was 25.2 and a student score of 26 or higher would be above that threshold. Of 45 students reaching the end of CHEM 2325 with Dr. Hobbs in Spring 2023, 35 scored above the threshold. This was 78% of students, so the criterion was met.

There is currently a lot of concern about increasing learning loss and decreased student engagement and performance in college classes, especially difficult classes like Organic Chemistry. Therefore we will use the same threshold this year, not increase it.

Note: We are not legally allowed to reproduce these exams, so a sample is not attached. However, the normalization data is available and is attached.

Attached Files

OR16_Norm_Sheet_Final_post.pdf

Findings Description:

[Note: As of 5-31-24, the results have not yet been collated but are expected to be analyzed before the assessment cycle is over.]

RELATED ITEM LEVEL 3

Action - ACS Organic Chemistry Test at end of CHEM 2325 Organic Chem II

Action Description:

[Results still being collated and analyzed as of 5-31-24 so no action can be assigned yet.]

RELATED ITEM LEVEL 1

Students Grasp and Can Apply Foundational Chemistry Concepts and Skills

Learning Objective Description:

A great deal of what chemists learn is built on a foundation of general chemistry principals laid out in first-year chemistry courses, and learning that foundational material well greatly improves a student's ability to learn more complex knowledge and skills later on in their development. Students will demonstrate a profound grasp of foundational chemistry concepts and skills, as laid out in the first-year courses CHEM 1411 and 1412 General Chemistry I and II. This objective underscores the importance of

these fundamental principles as they form the bedrock upon which all advanced chemistry education is built. Mastery of these topics is crucial for students' success in their subsequent years of study in chemistry. Key components of this learning objective include:

1. **Understanding of Measurement and Analysis**: Students will comprehend the significance of uncertainty in measurement and be adept at dimensional analysis. This forms the basis for accuracy and precision in chemical experimentation and data interpretation.
2. **Atomic and Electronic Structure**: Students will gain a thorough understanding of atomic theory, including atomic structure and electron configuration. This knowledge is fundamental to understanding chemical reactions and properties.
3. **Molecular Formulas and Nomenclature**: Mastery of ionic and molecular formulas, as well as chemical nomenclature, is essential for clear communication and understanding in chemistry.
4. **Stoichiometry**: Students will develop proficiency in stoichiometry, a vital skill for quantifying substances in reactions and understanding chemical relationships.
5. **Thermochemistry and Chemical Thermodynamics**: An understanding of thermochemistry and the principles of chemical thermodynamics, including heat transfer and energy changes in chemical reactions, is crucial.
6. **Bonding Theories and VSEPR Theory**: Students will learn bonding theories and Valence Shell Electron Pair Repulsion (VSEPR) theory to predict molecular shapes and bond angles, which are key in determining molecular properties and behavior.
7. **Properties of Gases and Solutions**: Comprehensive knowledge of the properties of gases and solutions, including gas laws and solution concentrations, is important for understanding many chemical processes.
8. **Intermolecular Forces**: Understanding intermolecular forces enables students to predict and explain physical properties and phase changes of substances.
9. **Chemical Kinetics and Equilibrium**: Students will grasp the principles of kinetics and equilibrium, essential for understanding the rate of reactions and the balance between reactants and products.
10. **Acid-Base and Oxidation-Reduction Chemistry**: Mastery of acid-base concepts and oxidation-reduction reactions is fundamental to various chemical processes and applications.
11. **Electrochemistry**: Knowledge of electrochemistry, including galvanic and electrolytic cells, is critical for understanding energy production and material synthesis.

Through achieving these outcomes, students will not only establish a strong foundation in chemistry but also be well-prepared for advanced studies in the field. This deep understanding of fundamental concepts and skills is vital for their academic growth and future success in various chemistry-related careers.

RELATED ITEM LEVEL 2

ACS General Chemistry Test at Beginning of CHEM 3438 Biochemistry I
Indicator Description:
At the onset of the CHEM 3438 Biochemistry I course, all enrolled students will undertake the ACS General Chemistry Test, a nationally standardized assessment developed by the American Chemical Society Division of Chemical Education Examinations Institute. This test will be administered during laboratory sessions early in the course. The primary objectives of this assessment are twofold:

1. **Diagnosis of Prerequisite Knowledge**: Since CHEM 1411 and 1412 General Chemistry I and II are prerequisites for CHEM 3438, the test will serve as a diagnostic tool to identify any deficiencies in students' foundational knowledge. This will enable instructors to tailor their teaching strategies accordingly to address these gaps.
2. **Measurement of Concept Retention**: The test will also provide valuable data on students' retention of General Chemistry concepts over an extended period, typically between the first or second year and the third or fourth year of their college education. This longitudinal measure will help in evaluating the effectiveness of the General Chemistry courses in imparting and sustaining key chemistry knowledge.

The test will include questions covering a range of topics from General Chemistry, including atomic structure, stoichiometry, thermochemistry, bonding theories, and others as outlined in the General Chemistry I and II syllabi. The results from this test will be analyzed to gauge students' preparedness for advanced biochemistry topics and to identify areas where additional review or instructional support may be required.

Note: We cannot legally reproduce these exams, but the normalization data is available and is attached (this is the 2006 ACS General Chemistry 2nd Term Form).

Dr. Haines will give the exam in Fall and Spring Biochemistry I Laboratory and collate the results.

Attached Files

General-Chemistry-Brief-Year-Form-2006.pdf

Criterion Description:

From last year, the target was that seventy-five percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized General Chemistry examination. The nationally normed mean on the ACS exam was 27.5 +/- 8.1 questions correct, so the threshold of 75% will be that students should have answered at least 20 (the next whole number above 19.4) questions or more correct. Of the three lab sections in the spring 2023, the number of students meeting this threshold was 7/16, 5/23, and 6/22 student met the threshold for a total of 18/71 students achieving at least 20 questions correct out of 50. That is only 25% of students meeting the criterion, the criterion was not met (the value is 1/3rd of the expected criterion).

It was observed that 1) students may not be taking the exam very seriously, the score does not count toward their grade but a low score does trigger a mandatory review module and 2) transfer students appear to lag students who took their General Chemistry at SHSU by a lot. It may be reasonable to disaggregate this data in the future into the two populations. Corrective action is needed, students are not able to answer questions about General Chemistry correctly in a later course, even though all students passed the course with a C or higher to reach Biochemistry I.

This year a more complex and nuanced criteria will be used, that 75% of department majors that took at least 3 of the 4 prerequisite chemistry steps at SHSU will score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized General Chemistry examination. Department majors not in this group will be the focus of a future ICF once we characterize this group that received more of their chemistry education at SHSU.

Findings Description:

The threshold score remains at least 20 questions correct out of 50, or 40% correct. In Fall 2023, 79 students took the exam (regardless of where they took the prerequisite) and the 75th percentile score was 22 questions correct.

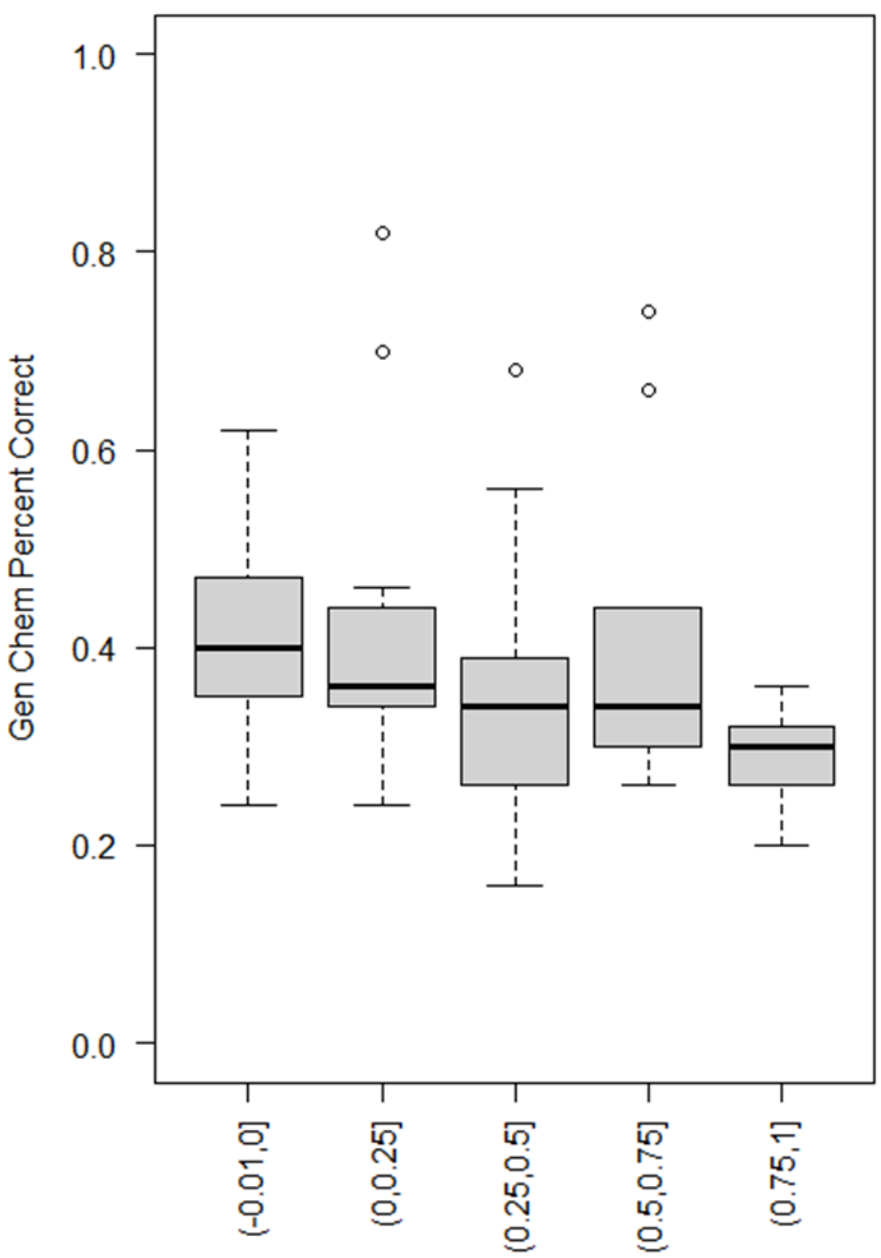
The results broken out by what fraction of prerequisites were taken at SHSU were as follows:

Percent Correct on ACS Exam

Fraction of Prereqs at SHSU	minimum	25th percentile	median	mean	std.dev	75th percentile	max	count
100%	24%	35%	40%	41%	11%	47%	62%	24
75%-99%	24%	30%	37%	40%	16%	43%	70%	6
50%-74%	20%	30%	36%	39%	16%	43%	82%	14
25%-49%	16%	26%	34%	36%	17%	41%	68%	7
0%-24%	24%	29%	33%	34%	9%	39%	48%	6

As can be seen in the table, for every level above 25% of prerreqs taken at SHSU, the 75th percentile of the test takers scored over 40%, so the criteria was met. For those who took their prereqs at other institutions, the score was just under 40%.

A very clear trend is apparent with the score distributions as shown on this boxplot (note: the x-axis on this graph is fraction of courses taken *elsewhere*, reverse of the above table; the 75% percentile is the top of each rectangular box):



There appears to be a very clear dose-response-type relationship, the more prereqs taken at SHSU the higher the student scores on this Gen Chem exam in CHEM 3438, which comes after both General Chem courses and both Organic Chemistry courses.

Although the criterion was met, and in fact would have been met with all students pooled together, the data clearly show students taking prereqs elsewhere are at a significant disadvantage. Mechanisms for helping those students reach a similar level of knowledge to those who took it at SHSU should be explored. In future years, the criteria for all students could be raised, as this threshold is still lower than we would like to achieve eventually.

RELATED ITEM LEVEL 3

Increase Review of General Chemistry in Biochemistry I

Action Description:

To increase student retention of General Chemistry knowledge (or fill it in where it was never learned), the review modules in CHEM 3438 should continue to be expanded and enhanced. Further, the department Chair will lead discussions with instructors in Fall 2024 in Faculty and Staff meetings to identify mechanisms to specifically support students that take General Chemistry or Organic Chemistry elsewhere (which includes transfer students, but also SHSU students who struggle to pass here and then take it at community college where it is generally easier to pass).

RELATED ITEM LEVEL 2

American Chemical Society (ACS) General Chemistry Test at end of CHEM 1412 Gen Chem II

Indicator Description:

Upon nearing the completion of the CHEM 1412 General Chemistry II course, all chemistry majors at Sam Houston State University are be invited to participate in the ACS General Chemistry Test. This nationally standardized assessment, crafted by the American Chemical Society Division of Chemical Education Examinations Institute, is designed to evaluate the comprehensive understanding of general chemistry concepts.

Key aspects of this assessment include:

1. **Comprehensive Evaluation of General Chemistry Knowledge**: The test aims to assess students' grasp of fundamental concepts covered in General Chemistry I and II, including atomic structure, stoichiometry, thermochemistry, bonding theories, and more. This provides a measure of the students' learning outcomes and the effectiveness of the course curriculum.
2. **Incentivization and Engagement**: To encourage participation and acknowledge excellence, the student achieving the highest score on this test will be awarded scholarship funds for a future semester. Additional scholarships will be distributed based on percentile performance, creating a motivating environment for students to perform to the best of their abilities.
3. **Benchmarking and Improvement**: The results from this standardized test offer valuable data for benchmarking our students' performance against national standards. This information is crucial for continually improving our teaching methodologies and course content.
4. **Preparation for Advanced Courses**: By participating in this assessment, students will also gain experience in taking standardized tests, which is beneficial for their future academic and professional pursuits, especially if they involve further chemistry education or certification exams.

The content of the test is aligned with the comprehensive topics taught in General Chemistry II, ensuring a holistic evaluation of the students’ knowledge and understanding in general chemistry.

Note: We cannot legally reproduce these exams, but the normalization data is available and is attached (this is the 2006 ACS General Chemistry 2nd Term Form).

Attached Files

General-Chemistry-Brief-Year-Form-2006.pdf

Criterion Description:

Last year, the criterion was that seventy-five percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized General Chemistry examination. In the Fall term, only two students took the exam. One met the threshold, one did not, so 50% of students met the threshold which is short of the criterion. In the Spring term, the Chair forgot to actually ask students to take the test so no data was collected. The criterion was technically not met, but with only 2 students taking the exam the only possible outcomes were 0%, 50%, or 100% meeting the threshold. That wasn't enough students for meaningful assessment.

For this year the exam needs to be better managed and communicated. We will only give the exam in the spring term, and will invite students who took CHEM 1412 either semester with better communication about the scholarships that can be won (still with separate fall and spring student pools to ensure fairness). The criterion was that seventy-five percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the national mean on the ACS standardized General Chemistry examination.

Findings Description:

In part due to weather disruptions at the Spring 2024 term, and in part due to the low value of the assessment due to the low number of students taking the exam, we did not end up giving this exam in Spring 2024. Therefore there are no findings.

RELATED ITEM LEVEL 3

Action - American Chemical Society (ACS) General Chem Test at end of CHEM 1412 Gen Chem II

Action Description:

The assessment itself did not happen, and has always been problematic (never attracting a significant number of students). In Fall 2024, Chair Haines will lead the faculty and staff in a discussion of alternate ways to asses the range of knowledge this test was meant to asses for inclusion in next year's assessment plan.

Goal 2: Mastery and Integration of Advanced Concepts in Key Chemistry Disciplines

Goal Description:

In the Chemistry program at Sam Houston State University, our objective is to ensure that students acquire and master advanced knowledge and skills in the principal subfields of chemistry, preparing them for successful careers and significant contributions to scientific research. This goal encompasses an in-depth study of Physical Chemistry, Biochemistry, Inorganic Chemistry, and Instrumental Analytical Chemistry, each integral to the diverse and evolving landscape of chemical sciences.

Physical Chemistry forms the core of our understanding of chemical systems, providing insights into thermodynamics, kinetics, and quantum mechanics. Mastery in this area is pivotal for innovations in material and drug design, contributing to advancements in healthcare and technology.

Biochemistry offers a window into the chemical processes within living organisms. Our program emphasizes the importance of understanding biochemical pathways, which is crucial for drug development and medical breakthroughs. This knowledge is fundamental in addressing global health challenges.

Inorganic Chemistry is vital for advancements in science and technology, given the broad applications of inorganic compounds in energy production, catalysis, medicine, agriculture, and electronics. Our curriculum focuses on equipping students with the skills to innovate in these fields, addressing societal needs and environmental concerns.

Instrumental Analytical Chemistry is essential for developing analytical skills crucial in identifying and solving complex societal problems. Our students learn to analyze chemical compositions, which is key in industrial quality control, environmental studies, forensic science, and material science, emphasizing the role of chemistry in sustainable development.

Each of these advanced courses — CHEM 4448 Physical Chemistry I, CHEM 3438 Biochemistry I, CHEM 4440 Instrumental Analytical Chemistry, and CHEM 4367 Advanced Inorganic Chemistry — not only provides comprehensive knowledge but also encourages critical thinking, problem-solving, and practical application. Our program ensures that students are not just recipients of information but active participants in research and innovation, ready to tackle contemporary challenges in science and technology.

Furthermore, we emphasize the importance of interdisciplinary collaboration, recognizing that the most pressing scientific problems often require a multifaceted approach. Students are encouraged to apply their chemical knowledge in cross-disciplinary contexts, fostering a broader understanding and adaptability in a rapidly changing scientific landscape.

Through this goal, we aim to produce graduates who are not only well-versed in advanced chemical concepts but also skilled in applying this knowledge creatively and effectively in a variety of professional and research contexts. We are committed to nurturing the next generation of chemists who are equipped to drive scientific innovation and contribute positively to society.

Providing Department: Chemistry BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate In-Depth Knowledge and Application of Fundamental Biochemistry Concepts

Learning Objective Description:

Students will showcase a comprehensive understanding of biochemistry, which encompasses the study of the chemical processes and substances in living organisms. This objective focuses on several key areas of biochemistry, taught in the required first-semester course:

1. **Classification and Analysis of Biological Molecules**: Students will be able to identify and differentiate between various classes of biological molecules, such as carbohydrates, lipids, proteins, and nucleic acids. They should demonstrate an understanding of the physical and chemical properties of these molecules and their roles in biological systems.

2. **Protein Structure and Function**: A detailed understanding of protein structure, including primary, secondary, tertiary, and quaternary structures, is required. Students should be able to relate these structures to the functions of proteins, with a particular emphasis on enzyme action.

3. **Enzymatic Activity and Regulation**: Students will gain knowledge of enzyme kinetics, mechanisms of enzyme action, and factors affecting enzyme activity. They should understand the principles of enzyme regulation, including allosteric regulation and feedback mechanisms.

4. **Methods of Biochemical Study**: Students should be familiar with the techniques and methods used in the study of biochemistry. This includes understanding experimental approaches for the isolation, purification, and characterization of biological molecules, as well as the use of spectroscopy, chromatography, and electrophoresis.

5. **Application of Biochemical Concepts**: Beyond theoretical understanding, students are expected to apply these concepts to analyze and solve problems related to biochemical processes. This could include case studies, laboratory experiments, or problem-solving exercises that demonstrate their ability to apply biochemistry knowledge in practical scenarios.

Through achieving these outcomes, students will not only have a strong foundation in biochemistry but also the ability to apply this knowledge in various scientific contexts, preparing them for advanced study or professional careers in chemistry and related fields.

RELATED ITEM LEVEL 2

Assessment of Enzymatic Function Understanding in CHEM 3438 Biochemistry I

Indicator Description:

In CHEM 3438 Biochemistry I, a crucial learning outcome is for students to demonstrate a comprehensive understanding of enzymes – their nature and mechanism of action. To assess this, a specific free-response question will be included in the final exam of the course.

The assessment criteria and structure are as follows:

1. **Question Context and Content**: Students will be asked to explain what an enzyme is and how it works. The question is designed to be answered in a way that would be understandable to a student who has just completed Organic Chemistry II. This context requires students to articulate their answer in a clear, concise, and accurate manner, suitable for an audience with foundational chemistry knowledge but not necessarily specialized in biochemistry.
2. **Key Components of the Answer**: The expected response should cover:
    - **Basic Definition of Enzymes**: A clear and concise definition of enzymes as biological catalysts, including their proteinaceous nature.
    - **Mechanism of Action**: An explanation of how enzymes catalyze biochemical reactions, including concepts like the active site, substrate specificity, and the lowering of activation energy.
    - **Examples and Relevance**: Where appropriate, inclusion of examples to illustrate how enzymes function and their significance in biological processes.
3. **Evaluation Criteria**: The free-response question will be evaluated based on the accuracy of the content, the clarity of the explanation, the ability to communicate complex concepts in an accessible manner, and the completeness of the answer.
4. **Objective of the Assessment**: This question aims to assess students' ability to not only understand the biochemical principles of enzymatic action but also their skill in effectively communicating these concepts. It is a critical indicator of their grasp of fundamental biochemistry concepts and their ability to apply this knowledge in an explanatory context.

Through this assessment in CHEM 3438, students demonstrate their mastery of a key concept in biochemistry – the nature and function of enzymes. The results of this question provide valuable insights into the effectiveness of the teaching methods and the students' understanding of enzymatic mechanisms.

Criterion Description:

Last year the criterion was that at least 90% of students (set high as this knowledge is very fundamental to understanding of biochemistry) can achieve a score of at least three out of four points on the question. The instructor forgot to put the question on the final exam, so the data was not collected. Therefore, the same criterion (90% of students scoring at least 75% on the question) will be used again this year.

Findings Description:

The instructor forgot when writing the exam that this question was planned for assessment again. Therefore, the data is unavailable to evaluate and should be re-examined next year.

RELATED ITEM LEVEL 3

Action - Students can explain what an enzyme is and how it works

Action Description:

There are two actions needed:

1. Instructor Haines will put the exam question on a Biochemistry final exam in Fall 2024.
2. He will try to find a better method to remind instructors of planned assessments when they need to remember - which is in the mad rush near the end of the semester when they are writing their final exams. This is not a trivial problem.

RELATED ITEM LEVEL 2

Students Can Accurately Represent The Structure Of A Simple Protein

Indicator Description:

In CHEM 3438 Biochemistry I, a key skill for students to master is the accurate representation of protein structures, an essential aspect of understanding protein biochemistry. To assess this competency, a question will be included in the first exam of the course that tests students' ability to draw the chemical structure of a peptide given its amino acid sequence.

The assessment criteria are as follows:

1. **Representation of Peptide Structure**: Students will be provided with a specific amino acid sequence (for example, WERSAMH) and asked to draw the corresponding peptide structure. The sequence and contextual story may vary each semester to maintain the test's integrity.
2. **Contextual and Creative Question Setting**: To engage students and add an element of real-world application, the question will be framed in a creative and relatable context. For instance, a scenario where a friend wishes to get a peptide sequence tattoo representing school spirit for SHSU:
    - "A friend of yours is really weird, and not just because they like biochemistry so much (nearly as much as OChem). They are truly, madly in love with with SHSU and the Sammy Bearkat mascot. They decided they are going to get a tattoo that says ‘We R Sam H’, since everyone chanted ‘We are Sam Houston’ at the new student convocation, but written out as a peptide structure. Yes, really. You try to explain to them that they may want to put a little more thought into this, or maybe at least come up with a better phrase since everyone that can read peptide structures will wonder what ‘We R Sam H’ is about, but they are set on doing it. Write the structure for the peptide with the sequence WERSAMH in the correct ionization state at physiological pH (pH 7.4). Be sure to get it correct, as your friend clearly has enough problems without having to wear your mistake on their skin for the next couple of decades."
3. **Accuracy and Detail**: The drawing must accurately represent the peptide structure, including correct peptide bonding, side chain structures for each amino acid, and the overall peptide conformation. Special attention should be given to the ionization state of the peptide at physiological pH (7.4).
4. **Prerequisite Knowledge**: This question relies heavily on prerequisite knowledge of Organic Chemistry. A new assessment of knowledge of Organic Chemistry and review module for reviewing Organic Chemistry were implemented this year in the associated lab to help improve prerequisite knowledge in that area.

5. **Assessment of Understanding**: This question not only tests the students' ability to draw a peptide structure but also assesses their understanding of amino acid properties, peptide bond formation, and the behavior of peptides at physiological pH.

6. **Scoring Criteria**: The question will be scored by the instructor (Dr. Haines) on the accuracy of the peptide structure, the correct representation of ionization states, and the overall completeness of the drawing. Points will be allocated for each aspect of the peptide structure, ensuring a comprehensive assessment of the students' understanding and representation skills.

Through this assessment, students in CHEM 3438 demonstrate their proficiency in a fundamental aspect of biochemistry – the ability to accurately visualize and represent protein structures. The results of this question provide valuable insights into the students' grasp of protein biochemistry and their ability to apply this knowledge in a practical context.

Criterion Description:

Last year's criterion was that at least 80% of students would score at least 10/12 on the question, which is scored by the instructor of record. For Dr. Haines' Fall 2022 Biochemistry I section, 27 students took the exam and of those 13 scored 10 or higher and 14 did not. That is only 48% of students meeting the threshold that was set, well short of the goal of 80%. The criterion was not met, and action to improve student understanding of protein structure is needed. A lot of students were not far below the 10 point threshold, though a subset were. If those that weren't can be gain a bit more knowledge to score better, this criterion is reasonable and can be met in the future.

This year a similar criterion will be used, that at least 80% of students will score at least 80% of the points on the question on exam one. This will allow us to see if changes requiring student to review prerequisite knowledge of Organic Chemistry at the start of the course improve student skill attainment.

Findings Description:

For Dr. Haines' Fall 2023 Biochemistry I section, 33 students took the exam. Of those, 17 scored 10 or higher and 16 did not. That is only 52% of students meeting the threshold that was set, well short of the goal of 80%. The criterion was not met, and action to improve student understanding of protein structure is needed. A lot of students were not far below the 10 point threshold, though a subset were. If those that weren't can be gain a bit more knowledge to score better, this criterion is reasonable and can be met in the future. It appears that efforts in the past year may have improved student knowledge a little, but there is a lot more to be done.

RELATED ITEM LEVEL 3

Action - Students can Accurately Represent the Structure of a Simple Protein

Action Description:

For Fall 2024, Dr. Haines will add a new activity to the class exam review. The activity will specifically have groups of students build a peptide structure from a sequence. This addition should help.

RELATED ITEM LEVEL 2

Students Will Self-Report That They Learned A Lot in CHEM 3438 Biochemistry I

Indicator Description:

In addition to traditional exam question assessments in CHEM 3438 Biochemistry I, students' perception of their learning will be evaluated through a post-course Qualtrics survey. This survey serves as a complement to objective assessments, offering insights into students' subjective evaluation of their learning experience.

Key features of this survey include:

1. **Survey Timing and Distribution**: The survey will be distributed to students approximately one week before the last day of class by Dr Haines in Fall 2023 Biochemistry I, ensuring that they have experienced the full extent of the course content before reflecting on their learning.
2. **Survey Question Structure**: Students will be asked to respond to the statement 'I learned a lot this semester' using a numerical scale. This question is aimed at gauging students' self-assessment of the overall learning they achieved during the course.
3. **Rating Scale**: The response will be on a scale from 1 to 100, with 1 indicating strong disagreement and 100 indicating strong agreement with the statement. The scale defaults to a neutral score of 50, allowing students to indicate their level of agreement or disagreement with the statement effectively.
4. **Objective of the Survey**: The primary aim of this self-assessment is to capture students' subjective perceptions of the amount of learning they have experienced in the course. It serves as an indirect measure of the course's effectiveness from the students' perspective.
5. **Analysis and Interpretation of Results**: The collected data will be analyzed to understand the perceived effectiveness of the course in facilitating student learning. The average scores, distribution of responses, and any trends identified will provide valuable insights into students' self-perceived learning outcomes.
6. **Continuous Course Improvement**: The survey results will inform continuous improvement efforts for CHEM 3438 Biochemistry I. Insights gained will be used to modify and enhance the course structure, content, and teaching methodologies, aiming to maximize student learning and engagement.

Through this self-reported learning assessment, students in CHEM 3438 provide feedback on their own learning experiences, contributing to a comprehensive evaluation of the course's effectiveness in teaching biochemistry.

Criterion Description:

Last year, the criterion was that 80% of students give an agreement rating of 75% or more. A total of 14 students responded to the survey and gave an average score of 90 +/- 6 on the question (scores ranged from 80.0-100.0). Since all students gave scores of 80 or higher, 100% of students gave an agreement rating of 75% or more and the criterion is met.

This year, the criterion will be raised to 90% of students giving a rating of 75% or more to try to maintain that high standard of student self-assessment of their learning in the area of biochemistry.

Findings Description:

In Fall 2023, 15 students responded to the question. The average was 87.6, and the standard deviation was 18.6. Only 1 student rated their agreement a score below 75 (they gave it a 25), and 7 students (nearly half the respondees) rated it a perfect 100. The criterion is met.

RELATED ITEM LEVEL 3

Action - Student Self-Assessment of Knowledge Learned

Action Description:

The criterion was met, and students feel like the learn a lot in Biochemistry I. The main action is to continue to work hard for students in the course to maintain this high student evaluation of learning.

RELATED ITEM LEVEL 1

Mastery of Instrumental Analytical Methods and Their Application in Chemistry

Learning Objective Description:

Students will achieve in-depth proficiency in understanding and applying instrumental analytical methods, with a focus on mastering advanced scientific instrumentation and data analysis. This objective is integral to the curriculum of our Instrumental Analytical Chemistry course (CHEM 4440), and includes the following key aspects:

1. **Comprehensive Understanding of Instrumentation**: Students will develop an extensive knowledge of advanced scientific instruments used in spectrophotometry, chromatography, and mass spectrometry. This includes understanding the operational principles, components, and functionalities of these instruments, as well as the types of analyses they are best suited for.
2. **Hands-On Instrument Operation**: Proficiency in the practical operation of these instruments is essential. Students must be able to set up and calibrate instruments correctly, perform routine maintenance, troubleshoot common issues, and conduct experiments with a high level of precision and accuracy.
3. **Advanced Data Analysis Skills**: Students will cultivate advanced skills in analyzing and interpreting data generated from these instruments. This involves using sophisticated statistical and computational methods to process data, identify patterns, quantify substances, and validate results.
4. **Critical Evaluation of Instrumental Methods**: Students are expected to critically evaluate the strengths, limitations, and appropriate applications of different instrumental methods. This includes understanding the sensitivity, accuracy, and precision of different techniques and choosing the appropriate method for specific analytical challenges.
5. **Integration of Computers in Instrumentation**: Mastery in utilizing computers for data acquisition, processing, and interpretation is a critical component. Students must be proficient in the use of software and digital tools that are integral to modern analytical instrumentation.
6. **Effective Communication of Analytical Results**: The ability to communicate complex data and analyses clearly and effectively through complex technical writing and presentations is paramount. Students should be adept at preparing detailed reports, graphs, and presentations that accurately convey their findings and methodologies.
7. **Use of Scientific Literature and Current Trends**: Students should be capable of engaging with current scientific literature to inform their understanding and application of instrumental methods. This includes staying abreast of emerging technologies and advancements in the field of analytical instrumentation.
8. **Laboratory Safety and Ethics**: Adherence to safety protocols and ethical standards in the operation of advanced instrumentation and handling of samples is crucial for responsible scientific practice.

Through this learning objective, students will not only gain a thorough understanding of modern analytical instruments but also develop the critical skills needed to analyze and interpret complex scientific data. This comprehensive proficiency is fundamental for their future roles in scientific research, industrial applications, environmental monitoring, and other fields where advanced analytical skills are essential.

RELATED ITEM LEVEL 2

Examinations In Instrumental Analytical Chemistry

Indicator Description:

In the CHEM 4440 Instrumental Analytical Chemistry course, a crucial component of the assessment process is a series of structured examinations designed to evaluate students' mastery of the fundamentals of modern analytical instrumentation. These examinations are essential in

determining the students' understanding and application of electronic, sampling, schematic, and computational principles in analytical chemistry.

Key features of these examinations include:

1. **Exam Structure and Content**: The course includes three 80-minute tests and a comprehensive final examination. Each test consists of essay questions, laboratory data evaluation, and calculator-based computations, offering a multifaceted approach to assess students' knowledge and analytical skills.
2. **Evaluation of Core Competencies**: The exams are designed to rigorously evaluate students' proficiency in the key areas of Instrumental Analytical Chemistry, including understanding of instrument operation, data interpretation, problem-solving, and computational analysis.
3. **Standardization Across Sections**: The testing methodology and content are standardized across all sections of the course within the department, ensuring consistency and fairness in assessment.
4. **Performance Expectations**: The department sets a high standard for student performance, expecting that at least 82.5% of chemistry majors will score within one standard deviation of the mean or higher on these examinations. This benchmark reflects the department's commitment to academic excellence and mastery of the subject matter.
5. **Analysis of Results for Continuous Improvement**: The department recognizes the importance of statistical variability in assessment results. Analysis of test scores, including variations across tests and year-to-year trends, is conducted to continually refine teaching methods and course content. This process is crucial for maintaining the high quality of the Instrumental Analytical Chemistry program and ensuring that it effectively meets the learning needs of students.

Through these comprehensive examinations, the CHEM 4440 course aims to rigorously assess and confirm students’ mastery of instrumental analytical techniques, preparing them for advanced study and professional work in the field of chemistry.

Criterion Description:

Eighty two and one half percent of chemistry majors are expected to score within one standard deviation of the mean or higher than one standard deviation above the mean on the four examinations in this class. We expect statistical variability from test to test and from year to year. Last year, this criterion was used and met with each exam having at least 84% of students score within one standard deviation of the mean or higher.

Findings Description:

On exam one, 49 of 55 students scored at the required level, or 89% of students who took the exam.

On exam 2, 47 of 55 students scored at the required level, or 85% of students who took the exam.

On exam 3, 49 of 55 students, for 89%.

On the final exam, 52 out of 55, for 95%.

Since all are above 82.5% of students, and the total is 197 out of 220, or 90% of scores meeting the criterion, the criterion is met.

RELATED ITEM LEVEL 3

Action - Examinations in Instrumental Analytical Chemistry

Action Description:

The criterion was met, but this measure of student success is pretty broad. In the future, more granular assessments should be used.

RELATED ITEM LEVEL 1

Proficient Understanding and Application of Thermodynamics and Spectroscopy in Physical Chemistry

Learning Objective Description:

Students will demonstrate a proficient understanding and application of key concepts in Thermodynamics and Spectroscopy within Physical Chemistry, as taught in Physical Chemistry I (CHEM 4448). This objective encompasses mastering advanced topics and applying them to various spectroscopic techniques. Key components of this learning objective include:

1. **Advanced Thermodynamics Concepts**: Students will develop a deep understanding of thermodynamic principles, including the laws of thermodynamics, enthalpy, entropy, Gibbs free energy, and their applications in chemical systems.
2. **Quantum Theory and Wave Functions**: Mastery of quantum theory fundamentals and the behavior of wave functions is essential. This includes understanding the Schrödinger equation, quantum numbers, and the interpretation of wave functions in chemical contexts.
3. **Molecular Structure and Orbital Theory**: Students will gain comprehensive knowledge in molecular orbital theory, electronic configuration, and molecular structure. This includes understanding the formation of chemical bonds, molecular orbital diagrams, and the role of electron configurations in determining molecular properties.
4. **Symmetry and Group Theory**: An understanding of symmetry elements and group theory in chemistry is critical. Students should be able to analyze molecular symmetry and apply group theory to predict molecular vibrations and electronic transitions.
5. **Spectroscopic Techniques and Applications**: Students will learn the principles and applications of various spectroscopic techniques, including X-ray, ultraviolet (UV), visible, infrared (IR), Raman, and magnetic resonance spectroscopy. They should understand how these techniques are used to deduce molecular structure, dynamics, and chemical environments.
6. **Integration of Theoretical and Practical Knowledge**: Students are expected to integrate theoretical knowledge with practical applications. This includes solving problems and analyzing data from spectroscopic experiments to elucidate chemical phenomena.
7. **Critical Analysis and Problem-Solving Skills**: Development of critical analysis and problem-solving skills is crucial. Students should be able to apply their knowledge to interpret experimental results and solve complex problems in physical chemistry.

Through achieving these outcomes, students will not only have a solid foundation in the theoretical aspects of thermodynamics and spectroscopy but also be proficient in applying these concepts to practical scenarios. This comprehensive understanding is vital for their future academic and professional endeavors in the field of chemistry, where thermodynamics and spectroscopy play a pivotal role.

RELATED ITEM LEVEL 2

CHEM 4448 Physical Chemistry I Final Examination

Indicator Description:

CHEM 4448 is required of all chemistry majors. The final examination in Physical Chemistry I (CHEM 4448), written by Dr. Darren Williams, is recognized by the faculty of the Department of Chemistry as being comprehensive and covers all of the advanced topics listed in the objective statement. Dr. Williams is the sole instructor of CHEM 4448 at SHSU having taught all sections of CHEM 4448 since his arrival on campus in 2004, although in the Spring 2023 term a new professor Dr. Schaugaard will teach a spring offering of the course. All students are required to complete the final examination. Examples of final exams are on file and secured within the Department of Chemistry and may be viewed by contacting Dr. Williams directly at williams@shsu.edu.

Criterion Description:

Seventy-five percent of chemistry majors are expected to demonstrate a mastery of at least sixty percent of the material (score 60%) on the comprehensive final examination.

Findings Description:

In Fall 2023, the final exam was taken by 20 students with a low score of 34% and high score of 82%. Of the 20 scores, 14 students scored 60% or higher on the exam. That is 70% of students, slightly short (one student short) of the 75% in the criterion.

An examination of the background of students scoring low on the exam (and in the course) when a separate analysis was done suggested the scores vary surprising strongly with a student's grade in Calculus II, one of the prerequisites for the course. Calculus skills may be a factor (though it maybe that the issue is a factor that correlates to both Calc II grades and Physical Chemistry grades, not directly an issue of insufficient Calculus II skills).

RELATED ITEM LEVEL 3

Action - CHEM 4448 Physical Chemistry I Final Examination

Action Description:

Dr. Haines will discuss the observed Calc II dependence of student performance with the Physical Chemistry instructors in Spring 2024 and Fall 2024. Together, they will determine how best to support or enhance that background knowledge for students entering Physical Chemistry.

It was further observed that of the six students that scored less than 60%, all but one had C grades in Calculus II. The other student had an A, but had the top score of the group. Therefore, the Faculty should also discuss whether it is feasible and/or desirable to raise the prerequisite from a C or higher in that course to a B or higher.

Goal 3: Students Develop Expertise and Proficiency in Highly Specialized Chemistry and Can Apply The Breadth of Chemistry to Solving Problems

Goal Description:

In our Chemistry program at Sam Houston State University, we are dedicated to providing our students with a profound and practical understanding of specialized topics in chemistry, essential for a well-rounded and advanced education in the field. This goal focuses on the development of highly specialized knowledge in courses that offer deep dives into specific, high-level areas of chemistry, paired with extensive laboratory and research experience.

The CHEM 4327 Polymer Chemistry course is central to this goal, as it explores the complex chemical properties and diverse applications of polymers, which are integral to numerous industries including plastics, textiles, and electronics. This course not only provides theoretical knowledge but also emphasizes practical applications and current research trends in polymer science.

Physical Chemistry II (CHEM 4449) builds upon the foundational principles learned in earlier courses. It delves into advanced topics of thermodynamics, phase diagrams, equilibria, and kinetics, which are traced from the statistical mechanics of quantum states to the macroscopic observations of thermodynamics. This course is essential for students to comprehend and predict chemical behavior at a molecular level.

CHEM 4395 Undergraduate Research is another cornerstone of this goal, offering students the unique opportunity to engage in independent research projects under the mentorship of experienced faculty. This hands-on experience is crucial for developing critical research skills, fostering innovation, and potentially leading to significant discoveries and publications.

Lastly, CHEM 4260 Advanced Integrated Lab represents the culmination of the students' learning journey. In this lab, students apply the comprehensive knowledge and skills they have acquired to tackle complex, real-world challenges. This course is designed to simulate a professional scientific environment, preparing students for their future careers in the field. It is a major challenge that requires them to apply with their own hands all of the fundamental and advanced chemical expertise that they have developed to solve detailed problems.

Overall, these courses are not only pivotal for acquiring advanced knowledge in chemistry but also for developing the practical skills and innovative thinking necessary for success in the rapidly evolving field of chemistry. Through these specialized subjects, our students are equipped to contribute meaningfully to scientific research and the broader scientific community.

Providing Department: Chemistry BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Expertise in Conducting and Analyzing Advanced Chemistry Laboratory Experiments

Learning Objective Description:

Students will demonstrate expertise in conducting and analyzing advanced laboratory experiments in chemistry, showcasing an array of skills honed through their coursework. This objective focuses on several key areas of laboratory proficiency. Key components of this learning objective include:

1. **Experimental Design and Execution**: Students will be adept at designing experiments to test hypotheses or investigate chemical phenomena. This includes selecting appropriate methods, setting up experimental apparatus, and conducting experiments safely and effectively.
2. **Technical Skills and Instrumentation**: Mastery of a range of technical skills and the use of advanced laboratory equipment is essential. Students should be proficient in handling various instruments and tools, performing accurate measurements, and executing complex experimental procedures.
3. **Data Collection and Management**: Students will efficiently collect, organize, and manage experimental data. This includes using proper techniques to ensure the accuracy and reliability of data collected during laboratory experiments.
4. **Analytical and Critical Thinking in Data Analysis**: Students should demonstrate analytical skills in interpreting experimental results, applying statistical methods where appropriate, and drawing informed conclusions based on their data.
5. **Problem-Solving and Troubleshooting**: The ability to identify and troubleshoot experimental problems is crucial. Students should be able to make adjustments and think critically to overcome challenges encountered during laboratory work.

6. **Understanding of Chemical Safety and Ethics**: Knowledge and adherence to laboratory safety protocols and ethical guidelines in conducting experiments are mandatory. Students should be aware of potential hazards and conduct all laboratory work in a safe and responsible manner.

7. **Effective Communication of Experimental Findings**: Students must be able to clearly and effectively communicate their experimental findings. This includes preparing detailed lab reports, presenting data in a clear and organized manner, and discussing their results and methodologies.

8. **Collaboration and Teamwork**: Often, advanced laboratory work involves teamwork. Students should demonstrate the ability to work collaboratively, contributing effectively to group projects and respecting the diverse roles and perspectives within a team.

Through achieving these outcomes, students will not only refine their laboratory skills but also develop a comprehensive understanding of the scientific process. This expertise is fundamental for their future roles in scientific research, industry, or academia, where the ability to conduct and analyze complex experiments is critical.

RELATED ITEM LEVEL 2

Faculty Evaluate Undergraduate Student Research Project Work
Indicator Description:
Indicator Description:

In the CHEM 4395 undergraduate research course, which is a requirement for Chemistry majors at least once (and up to three times for those seeking Academic Distinction or engaged in an honors thesis), the evaluation of students' research projects is conducted directly by their faculty research advisors. This process is crucial for ensuring the quality and rigor of student research work.

Key aspects of this evaluation process include:

1. **Evaluation Criteria**: Faculty research advisors assess students based on several criteria, including the level of participation in the research project, adherence to safety protocols in the laboratory, and the overall achievement and quality of the research work. These criteria are designed to evaluate both the process and the outcome of the research efforts.

2. **Grading System**: The course grading reflects the faculty advisor's assessment of the student's performance. By tradition, a grade of 'A' is awarded to students who meet a baseline level of participation, safe work practices, and research achievement. Grades lower than 'A' indicate varying degrees of lack of engagement or achievement in the research project.

3. **Communication with the Department Chair**: The faculty research advisor communicates the proposed grade to the Department Chair, who serves as the instructor of record for the course. This ensures that the evaluation and grading process is consistent and transparent within the department.

4. **Direct Indicator of Student Performance**: The grade assigned in CHEM 4395 is a direct result of the faculty member's evaluation of the student's research performance. As such, it serves as a reliable indicator of the student's proficiency in conducting undergraduate research, reflecting their ability to engage in scientific inquiry, maintain laboratory safety, and achieve meaningful research outcomes.

5. **Continuous Improvement and Feedback**: This evaluation process not only provides an indicator of individual student performance but also offers valuable feedback for continuous improvement in teaching, research supervision, and curriculum development in the Chemistry program.

Through this structured assessment process, the faculty's evaluation in CHEM 4395 serves as a critical indicator of students' ability to conduct research effectively, safely, and successfully, preparing them for future academic and professional pursuits in the field of chemistry.

Criterion Description:

Of the undergraduate chemistry students graduating each year, 100% will have at least one CHEM 4395 course that received a grade of 'A'. This same criterion was used last year and was successful.

Findings Description:

In Spring 2024, 11 students graduated with majors in Chemistry according to CampusConnect. Of those 100% had at least one CHEM 4395 course with a grade of A. In fact, the number of courses taken by each student were:

4 students with one attempt, all A's

6 students with 3 attempts, all A's (note: multiple attempts useful for earning the honor 'Academic Distinction')

1 student with 4 attempts, all A's

Since all students had a least one attempt with a grade of A, the criterion is met.

RELATED ITEM LEVEL 3

Action - Faculty Evaluate Undergraduate Student Research Project Work as Appropriate

Action Description:

The criterion was met, so continue to support student research efforts and maintain the high performance.

RELATED ITEM LEVEL 2

Proficiency in Chemometrics for Species Concentration Analysis in Advanced Integrated Laboratory

Indicator Description:

In the Advanced Integrated Laboratory course, typically taken in the final semester of the BS Chemistry degree, students engage in a sophisticated 'Chemometrics Lab' experiment. This experiment is designed to assess their ability to apply chemometric techniques for determining the concentration of various species in an unknown mixture using UV-vis spectroscopy.

Key elements of the experiment include:

1. **Theoretical Foundation**: Students receive a detailed handout that covers the fundamentals of chemometric analysis. This includes the principles of Linear-Least-Squares Minimization of residuals, along with basic statistical concepts like variance, covariance, and deviation.
2. **Preparation of Standard Solutions**: Students must meticulously prepare solutions of at least three different UV-vis active metals in water. This process tests their skills in accurate solution preparation and dilution techniques, which are critical for reliable chemometric analysis.
3. **Determination of Molar Absorptivity**: For each standard solution, students are required to determine the molar absorptivity at a series of wavelengths. This step is crucial for establishing the calibration data necessary for subsequent analysis.
4. **Analysis of an Unknown Mixture**: Students are tasked with determining the concentrations of each species in an unknown mixture using at least two different methods developed in the handout. This analysis must be based on data obtained from a single UV-vis spectrum of the mixture.

5. **Spectral Data Acquisition and Processing**: Proper acquisition of UV-vis spectra, using appropriate parameters and setup, is essential. Students must demonstrate their ability to collect and correctly input spectral data into a spreadsheet for analysis.
6. **Evaluation Criteria**: The experiment is assessed based on the accuracy and precision of the solution preparation, the quality of the spectral data obtained, the correct application of chemometric methods, and the accuracy of the concentration determinations.
7. **Objective of the Assessment**: This experiment aims to evaluate students' proficiency in applying chemometric techniques in a practical laboratory setting. It tests their understanding of the theoretical aspects of chemometrics and their ability to accurately prepare solutions, obtain and process spectral data, and apply statistical methods to analyze complex mixtures.

Through this comprehensive chemometrics experiment in the Advanced Integrated Laboratory course, students demonstrate their capability to integrate theoretical knowledge with practical laboratory skills in the field of analytical chemistry. The results of this assessment provide valuable insights into the students' readiness for professional practice in chemical analysis.

Criterion Description:

The target is that 75% of students will be able to accurately determine the concentrations of the species based on UV-vis spectrum using chemometrics in a properly set-up spreadsheet as judged by the instructor of the lab.

Findings Description:

[This data has not been aggregated, and the instructor has been out of town through the second half of May. We will try to add it over the summer.]

RELATED ITEM LEVEL 3

Action - Using Chemometrics to Determine Concentration

Action Description:

[This data has not been aggregated, and the instructor has been out of town through the second half of May. We will try to add it over the summer.]

RELATED ITEM LEVEL 1

Master and Apply Advanced Concepts in Physical Chemistry Focusing on Quantum Mechanics

Learning Objective Description:

Students will master and effectively apply advanced concepts in Physical Chemistry, with a special emphasis on Quantum Mechanics. This learning objective is rooted in the deep understanding of the relationship between quantum states and macroscopic thermodynamic phenomena. Key components of this learning objective include:

1. **Thermochemistry and Thermodynamics**: Students will gain an in-depth understanding of thermochemistry and the fundamental principles of thermodynamics. This includes studying the laws of thermodynamics, energy transfer, heat capacity, and the thermodynamic properties of systems.
2. **Phase Diagrams and Equilibria**: Mastery in interpreting and analyzing phase diagrams is essential. Students should understand phase transitions, phase equilibrium, and the application of these concepts in different chemical systems.
3. **Chemical Kinetics and Reaction Dynamics**: Students will learn the principles of chemical kinetics and reaction dynamics, including rate laws, reaction mechanisms, and factors affecting reaction rates. This also involves understanding the connection between microscopic quantum states and macroscopic reaction rates.

4. **Statistical Mechanics and Quantum States**: A critical component is the understanding of statistical mechanics and its role in explaining the behavior of quantum states. Students should be able to relate quantum mechanical models to observable thermodynamic properties.

5. **Application of Quantum Mechanics in Chemistry**: Students will apply quantum mechanical concepts to solve problems in physical chemistry. This includes the use of mathematical models and computational methods to predict chemical behavior based on quantum mechanics.

6. **Integration of Theory and Practice**: Students are expected to integrate theoretical knowledge with practical application, demonstrating their understanding through problem-solving exercises, laboratory experiments, or computational simulations.

7. **Critical Thinking and Analytical Skills**: Development of critical thinking and analytical skills is crucial, enabling students to analyze complex data, draw conclusions, and apply quantum mechanical principles to broader chemical phenomena.

Through achieving these outcomes, students will not only develop a comprehensive understanding of advanced concepts in Physical Chemistry, particularly Quantum Mechanics, but also be adept in applying these principles to real-world chemical problems. This knowledge is fundamental for their academic growth and future careers in scientific research and industry, where advanced physical chemistry knowledge is essential.

RELATED ITEM LEVEL 2

Comprehensive Final Examination in CHEM 4449 Physical Chemistry II
Indicator Description:
The CHEM 4449 Physical Chemistry II course, a requirement for all chemistry majors at Sam Houston State University, culminates in a comprehensive final examination. This examination, meticulously crafted by Dr. Darren Williams, is a critical component in assessing the students' understanding and mastery of the advanced topics covered in the course.

Key features of this final examination include:

1. **Coverage of Advanced Physical Chemistry Topics**: The exam thoroughly covers all advanced topics outlined in the course's objective statement, such as quantum mechanics, spectroscopy, statistical mechanics, and thermodynamics. This ensures a complete evaluation of the students' knowledge and comprehension of the subject matter.

2. **Comprehensive Assessment of Student Learning**: Recognized by the Department of Chemistry faculty for its rigor, the final exam serves as a definitive measure of the students' grasp of complex physical chemistry concepts. It tests not only their theoretical understanding but also their ability to apply these concepts to solve advanced problems.

3. **Benchmark for Academic Standards**: The exam sets a high benchmark for academic excellence in physical chemistry, aligning with the department's standards for knowledge and expertise in the field. It is a vital tool for gauging the effectiveness of the teaching and learning processes in CHEM 4449.

4. **Feedback for Continuous Improvement**: The results of this final examination provide valuable feedback to both students and faculty. For students, it highlights areas of strength and opportunities for further growth in physical chemistry. For faculty, it offers insights into how effectively the course material is being taught and understood, guiding potential curriculum enhancements.

The final exam in CHEM 4449 Physical Chemistry II, through its comprehensive and rigorous nature, plays a pivotal role in the academic journey of chemistry majors, preparing them for advanced studies and professional pursuits in the field of chemistry.

Dr. Williams is the sole instructor of CHEM 4449 at SHSU having taught all sections of CHEM 4449 since his arrival on campus in 2004. All students are required to complete the final examination. Examples of final exams are on file and secured within the Department of Chemistry and may be viewed by contacting Dr. Williams directly at williams@shsu.edu.

Criterion Description:

Last year, the criterion was that seventy-five percent of chemistry majors are expected to demonstrate a mastery of at least sixty percent of the material (score 60%) on the comprehensive final examination. Seven students took the course in Spring 2023. Of those, all seven scored above 60% so the criterion was met (far exceeded).

This year, a criterion of at least 90% of majors scoring at least sixty percent on the exam.

Findings Description:

In Spring 2024, 9 students took the exam. Of those, 7 scored 60 or higher and 2 scored below 60 (46 & 58). That is 78% of students, so the criterion is not met.

Note that the number of students makes this assessment noisy.

RELATED ITEM LEVEL 3

Action - CHEM 4449 Physical Chemistry II Final Exam

Action Description:

The issue appears to be more about student effort and engagement than a specific pedagogical problem and it passed easily last year. As such, it will be re-assessed next year.

Goal 4: Excellence in Scientific Communication: Oral and Written Skills Mastery

Goal Description:

In the field of science, effective communication is a cornerstone skill that supports long-term success across all career paths. Recognizing this, our Bachelor of Science in Chemistry program places a significant emphasis on developing robust oral and written presentation skills. Scientific topics, known for their complexity and nuanced details, require a clear and articulate mode of communication to be understood accurately by diverse audiences.

Oral Communication: Our program offers multiple platforms for students to develop and refine their oral communication skills. This includes presenting research findings and scientific concepts in various settings - from classroom discussions to academic conferences. Students learn to convey complex scientific information in a clear, concise, and engaging manner, adapting their presentations for both technical and non-technical audiences. This skill is critical in settings such as academic symposiums, industry meetings, and public outreach programs.

Written Communication: Similarly, the program places a strong emphasis on developing written communication skills. Through assignments like lab reports, research papers, and literature reviews, students learn to articulate scientific ideas, methodologies, and findings with precision and clarity. This training is invaluable for preparing manuscripts for scientific journals, grant proposals, and technical documentation in research and industrial settings.

Interdisciplinary Communication: Moreover, the program recognizes the growing importance of interdisciplinary communication. Students are encouraged to develop skills to communicate chemical concepts to colleagues in related fields like biology, physics, and engineering, fostering collaborative research and innovation.

Real-World Applications: To ensure that our graduates are well-prepared for their future careers, whether in academia, research, or industry, the program provides real-world communication scenarios. This includes collaborations with industry partners, participation in research projects, and engagement in community science outreach programs.

Feedback and Continuous Improvement: Throughout their studies, students receive constructive feedback on their communication skills. This feedback mechanism, coupled with numerous opportunities for practice, ensures continuous improvement and mastery of scientific communication.

This goal is dedicated to nurturing well-rounded chemists who are not only experts in their field but also exceptional communicators. This dual competency is essential for advancing in the modern scientific landscape, where the ability to effectively share knowledge and ideas is as important as the knowledge itself.

Providing Department: Chemistry BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Proficiency in Scientific Oral Communication

Learning Objective Description:

Students will showcase their proficiency in oral communication skills by effectively presenting a seminar to their peers, based on either their own research or research reported in the scientific literature. This skill is crucial in the field of chemistry for several key reasons:

1. **Clarity of Content**: Students must articulate their research topic, objectives, methodology, findings, and conclusions with clarity. This is vital as clear communication of complex chemical concepts and data ensures accurate understanding and facilitates scientific discourse.
2. **Organization**: The presentation should be logically structured with a defined introduction, body, and conclusion. Good organization is essential for effectively conveying research findings and theories in chemistry, which often involve complex processes and data.
3. **Engagement and Delivery**: Engaging the audience is critical in chemistry, where presentations often involve data-heavy or abstract concepts. Effective voice modulation, body language, and visual aids help in making the content more accessible and interesting.
4. **Critical Thinking and Understanding**: Demonstrating a deep understanding of the research topic and being able to engage in discussions reflect the ability to apply critical thinking – a key skill in experimental sciences like chemistry.
5. **Adherence to Time Constraints**: Managing presentation time effectively is crucial in scientific conferences and meetings, where chemists must present their findings succinctly and clearly within limited time frames.
6. **Use of Visual Aids**: In chemistry, visual aids like graphs, charts, and molecular models are essential tools for illustrating complex ideas and data. Effective use of these aids can significantly enhance understanding and retention of the presented information.

The development of oral presentation skills is not just about effective communication; it is also about developing the ability to think critically, organize complex information, and present it in an engaging and understandable manner. These skills are essential for chemists who often need to present their

findings to diverse audiences, including fellow scientists, funding bodies, and the general public. Proficiency in oral communication thus prepares students for a range of professional scenarios in academia, industry, and beyond, making it an indispensable part of their education in chemistry.

RELATED ITEM LEVEL 2

Chemistry Seminar Presentation

Indicator Description:

All chemistry majors are required to take CHEM 4100 "Chemical Literature Seminar". Students typically do so in their senior year. One of the requirements of this course is to give an oral PowerPoint presentation on either their research or research from the published chemical literature to the other students in the class. As part of the Fall 2023 and Spring 2024 semesters, students were tasked with completing a seminar topic form, including two supporting references and a reason why they were chosen.

Attached Files

Syllabus CHEM 4100 Spring 2022.pdf

Criterion Description:

Success was defined by submission of two supporting references by at least 80% of students and overall improvement in introductory and background slides as evaluated by the instructor.

Findings Description:

All students submitted a topic selection form that included at least two additional references. So that part of the criterion was met. Improvement in the presentation introductions seems to be occurring but could not be easily measured without a baseline presentation to compare it to. The additional references were cited on the slides in many cases.

RELATED ITEM LEVEL 3

Action - Chemistry Seminar Presentation

Action Description:

[The results from Spring 2024 are still being tallied as of 5-31-24 and action will be added at that point]

RELATED ITEM LEVEL 1

Develop Effective Written Communication Skills

Learning Objective Description:

Students will master the art of professional scientific writing, adhering to the high standards and conventions outlined in 'The ACS Guide to Scholarly Communication.' (This style guide is available at https://pubs.acs.org/doi/book/10.1021/acsguide.) This objective aims to equip students with the skills necessary to effectively communicate scientific information to a professional audience in the field of chemistry. Key aspects of this learning objective include:

1. **Understanding of ACS Writing Standards**: Students will become thoroughly familiar with the guidelines and standards for scientific writing as documented in 'The ACS Guide to Scholarly Communication.' This includes understanding the structure, style, and format of various types of scientific documents.
2. **Application of Professional Writing Techniques**: Students will apply these standards in creating well-structured, clear, and concise scientific documents. This includes writing lab reports, research papers, literature reviews, and grant proposals.
3. **Critical Analysis and Synthesis of Information**: Students will demonstrate the ability to critically analyze scientific literature and synthesize this information in their writing. This involves evaluating existing research, drawing conclusions, and effectively integrating these insights into

their written work.

4. **Effective Use of Language and Terminology**: Mastery in the use of scientific language and terminology appropriate to the field of chemistry is essential. Students should be able to convey complex scientific concepts accurately and understandably.

5. **Citation and Referencing Proficiency**: Students will exhibit proficiency in citing sources and referencing literature following the ACS guidelines, demonstrating academic integrity and respect for intellectual property.

6. **Revision and Peer Review Skills**: Students will engage in the process of revising and editing their written work, incorporating feedback from peer reviews. This process is crucial for achieving clarity, coherence, and adherence to professional standards.

7. **Effective Communication of Research Findings**: Students will learn to effectively communicate their research findings, including the use of appropriate graphs, tables, and figures to complement and clarify the text.

8. **Adaptability to Various Formats**: Students will be able to adapt their writing to different formats and purposes, such as journal articles, conference presentations, and public science communication.

Through achieving these outcomes, students will not only develop effective written communication skills but also gain an appreciation for the importance of professional standards in scientific discourse. Mastery of these skills is vital for their future careers in academia, research, industry, or any field where precise and impactful scientific communication is required.

RELATED ITEM LEVEL 2

Chemistry Majors Will Self-evaluate That Their Writing Has Improved as a Result of Their Writing-Enhanced Courses

Indicator Description:

To evaluate the effectiveness of writing-enhanced courses in improving writing skills among Chemistry majors, a targeted self-assessment survey will be developed and administered. This survey is designed to gauge students' perceptions of their writing skill development as a direct result of their coursework.

Key aspects of the survey include:

1. **Focused Survey Question**: The primary question of the survey will be centered around the statement, 'My writing has improved as a result of writing-enhanced chemistry courses.' This question aims to directly assess the students' self-perceived improvement in writing skills.

2. **Quantitative Scoring Scale**: Students will be asked to rate their agreement with the statement on a scale from 0 (strongly disagree) to 100 (strongly agree). This numeric scale provides a quantifiable measure of their perceived improvement, allowing for precise analysis of the survey results.

3. **Targeted Audience**: While the survey will be distributed to a broader group that includes all students that take a chemistry course this year, the results pertinent to this Indicator will be filtered specifically for responses from Chemistry majors. This ensures that the data accurately reflects the impact of writing-enhanced courses on the target student population.

4. **Data Analysis and Interpretation**: The collected data will be analyzed to determine the overall perception of writing skill improvement among Chemistry majors. The average scores, distribution of responses, and any provided qualitative feedback will be evaluated to gain insights into the effectiveness of writing instruction within the department.

5. **Actionable Insights for Curriculum Development**: The findings from this survey will inform the department about the effectiveness of current writing-enhanced courses and highlight areas for potential improvement. This feedback is crucial for curriculum development and enhancing the overall quality of writing instruction in the Chemistry program.

By utilizing this self-assessment survey, the Department of Chemistry aims to gather valuable student feedback on the impact of writing-enhanced courses, ensuring that these courses effectively support the development of critical writing skills in their majors.

Criterion Description:

The criterion last year was that at least 80% of Chemistry majors responding will give agree with a score of 51 or higher (since 51 would be minimal agreement). Twelve students responded to the question giving an average score of 83 +/- 12. The lowest score given was 69, so the criterion was exceeded by a significant margin. The criterion was significantly exceeded.

The ICF is being employed again this year, but with the new more stringent criteria of 80% of Chemistry majors responding with a score of at least 80 or higher. This should help ensure our major success in this area doesn't erode with time.

Findings Description:

As of 6-1-24, the survey is still open but 10 students responded to the survey question. Due to an issue with updated major concentrations in the curriculum not being updated in the survey questions (which had them select a major but specified the different concentrations using an outdated list), student self-identification as different chemistry majors was not reliable, so the results were analyzed using all respondees, not just chemistry majors.

Of the ten responses, 6 scored 51 or higher, so the criterion is not met. The median score was 71 and the average score was 58..

A different question may provide some insight into the lower results for this question. Students were asked to rate agreement with "I get detailed and appropriate feedback on my writing" and the average score was only 36. This suggests a lack of timely feedback on written work may be a factor, and should be worked on.

RELATED ITEM LEVEL 3

Action - Chemistry Major Self-Evaluation

Action Description:

Dr. Haines will lead faculty and staff discussions at the beginning of Fall 2024 about what challenges are causing slow feedback on written work in writing-enhanced classes and how they can be addressed. The discussion will include more broad coverage of how to improve student writing, as well.

RELATED ITEM LEVEL 2

Lab Assistant Evaluation of Student Writing Proficiency in CHEM 3438W Biochemistry I Laboratory Will Demonstrate Student Improvement to a Passing Level

Indicator Description:

In the CHEM 3438W Biochemistry I Laboratory, which is a writing-enhanced course, students engage in extensive scientific writing, a skill critical for their professional development. The course requires students to produce multiple large 'Formal Reports' and preliminary 'Results and Discussion' sections, emulating the format and standards of professional scientific research reports.

The assessment process involves several key steps:

1. **Sequential Writing and Feedback**: Students first submit the 'Results and Discussion' sections, which are drafts of parts of the larger Formal Reports [described in attachment]. These drafts receive feedback from undergraduate and graduate lab assistants, enabling students to refine their writing based on this input before submitting the complete Formal Report.

2. **Role of Lab Assistants**: The lab assistants, who have expertise in both the subject matter and scientific writing, play a crucial role in evaluating the students' writing. They provide detailed feedback aimed at improving the students' ability to communicate scientific information effectively and professionally.

3. **Evaluation Criteria and Rubric**: The writing artifacts are assessed using a specific rubric, which is detailed and implemented in Blackboard/Turn-it-In. Although the rubric cannot be exported as a text table, it includes criteria such as clarity of expression, accuracy of content, structure and organization, and adherence to scientific writing conventions. [See attachments.]

4. **Demonstration of Improvement**: The primary goal of this assessment is to ensure that students demonstrate significant improvement in their writing skills over the course of the semester. The lab assistants' evaluations are geared toward helping students reach a passing level or higher in their writing proficiency, reflecting the standards expected of professional scientists. The indicator will be the quality of their final large Formal Report.

5. **Documentation and Analysis**: While the specific rubric details are not available in text format, the attached two-part picture from the lab manual provides an overview. Analysis of the lab assistants' evaluations and student writing artifacts helps in understanding the efficacy of the writing-enhanced curriculum and in identifying areas for further improvement in teaching scientific writing.

Through this structured assessment process, the CHEM 3438W Biochemistry I Laboratory aims to cultivate advanced writing skills in students, preparing them for the rigors of scientific communication in their future academic and professional endeavors.

Attached Files

Report Pages from Biochemistry Lab Manual 2021-22.pdf

Rubric1.JPG

Rubric2.JPG

Criterion Description:

Last year, the criterion was that at least 90% of students will be evaluated to write an acceptable final Formal Report as indicated by a score of 70% or higher in the evaluation of the report. The number of students achieving the successful outcome for their report in three sections was 16/16, 23/23, and 22/22. All students reaching the end of the course were evaluated to have successfully written an acceptable final report. The criterion was met (exceeded).

There is ongoing concern about increasing learning loss and lack of student engagement, but we feel that the criterion can be increased slightly this year to 90% of students being evaluated to write an acceptable final Formal Report as indicated by a score of 80% or higher in the evaluation of the report.

Findings Description:

Fall 2023 Section 11: 11/15 scored 80% or higher

Fall 2023 Section 12: 20/24 scored 80% or higher

Fall 2023 Section 13: 11/14 scored 80% or higher

Fall 2023 Section 14: 20/24 scored 80% or higher

[Fall total: 62/77 students scored 80% or higher, or 80.5% of students]

Spring 2024 Section 11: 8/8 scored 80% or higher

Spring 2024 Section 12: 3/8 scored 80% or higher

Spring 2024 Section 13: 3/9 scored 80% or higher

Spring 2024 Section 14: 8/22 scored 80% or higher

[Spring Total: 22 of 47 students, or 46.8% of students]

Overall total: 84 of 124 students, or 67.7% of students.

The criterion was not met either semester nor was it met by the overall total. The data falls well short. Note that there is a significant difference between the two semesters. The same two lab assistants were used in the lab and spring and had two sections each, so variation in grading between lab assistants does not seem to be a major factor. Different populations of students take the course in spring versus fall (the distribution of majors is different, for example).

Especially in the spring term, students often did not get their feedback on their written drafts for many weeks and felt that impacted their later writing adversely.

RELATED ITEM LEVEL 3

Action - Lab-assistant Assessment of Student Writing
Action Description:
In future semester, try to shorten the time it takes to provide written feedback on Results and Discussion sections (which are basically drafts of those sections of the Formal Reports) and of Formal Report #1. Dr. Haines will work with the lab assistants to try to close the feedback loop in a more timely fashion.

RELATED ITEM LEVEL 2

Student Self-Assessment of Writing Improvement in CHEM 3438W Biochemistry I
Indicator Description:
In the writing-enhanced course CHEM 3438W Biochemistry I Laboratory, taught by Dr. Haines in Fall 2023 and Spring 2024, students' perception of their writing skill development will be evaluated through a post-course survey. This survey is designed to gauge the effectiveness of the course in enhancing students’ writing abilities, a critical skill in scientific communication.

Key aspects of the survey include:

1. **Specific Survey Question**: Students will be asked to respond to the statement 'My writing has improved as a result of taking this course.' This question directly addresses the course's impact on their writing skills.

2. **Quantitative Response Scale**: Students will rate their agreement with the statement on a scale from 0 (disagree strongly) to 100 (agree strongly). This numerical scale allows for quantifiable measurement of students' self-perceived improvement in writing.

3. **Objective of the Survey**: The primary aim of this self-assessment is to understand students' own perceptions of their progress in writing skills throughout the course. It serves as an indirect measure of the effectiveness of the writing-enhanced curriculum and instruction in developing these skills.

4. **Analysis and Application of Results**: The survey results will be analyzed to determine the overall effectiveness of the course in improving students' writing abilities. The distribution of responses and average scores will provide insights into the course's impact and areas where further enhancement might be needed.

5. **Continuous Improvement of Writing Instruction**: Feedback from this survey will inform future course developments and teaching strategies in CHEM 3438W. It will help in tailoring the course content and writing assignments to better meet students' needs and to strengthen their writing proficiency.

Through this self-assessment survey, students reflect on their own development in writing skills, providing valuable feedback to the instructor and the department on the effectiveness of the writing-enhanced approach in CHEM 3438W Biochemistry I Laboratory.

Criterion Description:

Last year the criterion was that at least 80% of students responding will agree that their writing improved at a level of 51 or higher on the scale of 0-100. The survey was given in Dr. Haines' Fall 2022 Biochemistry I lecture. Of the 14 students responding to the question, an average score of 83 +/- 13 was received (scores ranged from 50.0 to 100.0). Only one student gave a score of 50, the other 13 gave scores of 70 or higher. This is 93% so the criterion is met (significantly exceeded).

This year the criterion will be raised to more challenging target that 90% of students agreeing at a level of 70 or higher so we can try to maintain that level of self-assessed writing improvement.

Findings Description:

At the end of the Fall 2023 semester, 48 students responded to the question, with a mean rating of 74 and standard deviation of 25.

Of the 48 responses, 16 were below 70, and 32 were at 70 or higher, so only 67% of students agreed at a level of 70 or higher. This fails to meet the criterion and, in fact, would have failed to meet the lower criterion last year.

Students this year felt that feedback on their written work took too long (often many weeks) to get back and that it hurt their ability to to improve their writing. Perhaps that underlies the survey results.

RELATED ITEM LEVEL 3

Action - Student Self-Assessment of Writing

Action Description:

Dr. Haines will work the the lab assistants for Fall 2024 and Spring 2025 to try to return feedback in a more timely fashion. This should give students a better chance to learn from the feedback and improve over the course of the semester.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

In the big picture, the findings suggested most things assessed were on track, but a few spots revealed areas that needed attention:

- A major challenge is that retention of material from one course to another was very poor, with assessment of both General Chemistry (1st year chemistry) and Organic Chemistry (2nd year chemistry) in Biochemistry (taken by 3rd and 4th year students) revealing that most students could not meet the very low threshold that was set as our expectation (only around 25% of students met expectations).
    - This is likely at least partly aggravated by post-COVID issues with learning loss generally. This effect will likely improve with time.
    - A major fraction, though, is likely not due to COVID. To address this fraction:
        - Additional review of General Chemistry will occur in CHEM 3438 Biochemistry I, and the faculty and staff will discuss additional places reinforcement activities can occur. [Dr. Haines]
        - Additional review of Organic Chemistry will occur in CHEM 3438 Biochemistry I, and the faculty and staff will discuss additional places reinforcement activities can occur [Dr. Haines]
        - Additional supplemental information will be collected from students to obtain their perspectives on why retention is low. This will involve surveys of students in CHEM 3438 (likely added to the normal custom end-of-semester survey) [Dr. Haines]
- Knowledge and skills at the advanced course level were more of a mixed bag. In general, most items tested revealed students were developing the appropriate knowledge and skills. A few items that need attention, though, are:
    - The students' ability to analyze enzyme kinetics was not assessed properly (the graduate course assessment was reported not the undergraduate course that should have been). The data exists for the undergraduate course, so this assessment can still be completed. [Dr. Haines]
    - Students generally met the criteria for inorganic chemistry, learning to analyze inorganic catalysis and inorganic electronic structure and spectroscopy. However, as the criteria were not exceeded by much, additional efforts will be made to engage students not meeting the threshold. Further, the connection between empirical properties of inorganic complexes and conceptual properties that explain them (like donor properties of ligands) will be emphasized in future CHEM 4367 offerings. [Dr. Zall]
- Students were found to meet expectations for specific knowledge and skills in professional chemistry.
    - Evaluation of student research projects by their faculty mentors demonstrated that all met the requirements for at least a baseline level of success in the project (the research outcome did not have to be successful, but the student had to engage in the research enough for the experience itself was deemed successful). No action needed other than to maintain high-quality research training.
    - Assessment of students' chemometric skills in CHEM 4260 is ongoing (being analyzed) and will be completed. [Dr. Arney]
- Student written and oral communication has been an ongoing focus of department assessment and improvement for several years. As a result, current assessments of student communication all came out favorably, some by a significant margin. Changes are not required at this time, but we will work to maintain this strength. [Drs. Gross, Haines, Thompson, and Williams]

Update of Progress to the Previous Cycle's PCI:

Most, but not all, items were completed:

- Additional review of General Chemistry was added in CHEM 3438 Biochemistry I, and the faculty and staff discussed additional places reinforcement activities can occur. Some thought an additional required course would be useful, but the consensus is that we are not ready to do that (and may never reach consensus that it is wise).

- Additional review of Organic Chemistry was similarly added in CHEM 3438 Biochemistry I
- The survey asking students about their learning loss was not carried out and remains something that should be done.
- Students generally met the criteria for inorganic chemistry, learning to analyze inorganic catalysis and inorganic electronic structure and spectroscopy. However, as the criteria were not exceeded by much, additional efforts were made to engage students not meeting the threshold. Further, the connection between empirical properties of inorganic complexes and conceptual properties that explain them (like donor properties of ligands) was emphasized in the Spring 2024 CHEM 4367 offering by Dr. Zall.
- Students were found to meet expectations for specific knowledge and skills in professional chemistry.
- Assessment of students' chemometric skills in CHEM 4260 was not completed, and was used again this year with results again pending.
- Student written and oral communication has been an ongoing focus of department assessment and improvement for several years. Last year, assessments of student communication all came out favorably, some by a significant margin. Changes were not required at this time, but we worked to maintain this strength (with mixed results according to the new assessments).

New Plan for Continuous Improvement (BS Chem)

Closing Summary:

As last year, one major issue requiring action is the retention of knowledge from one class to another, especially the retention of foundational knowledge from General Chemistry and Organic Chemistry. Although slight improvement was observed over last year, it is still nowhere near where we think it should be. Therefore, we will carry out the following actions:

1. To increase student retention of General Chemistry knowledge (or fill it in where it was never learned), the review modules in CHEM 3438 should continue to be expanded and enhanced. Further, the department Chair will lead discussions with instructors in Fall 2024 in Faculty and Staff meetings to identify mechanisms to specifically support students who take General Chemistry or Organic Chemistry elsewhere (which includes transfer students, but also SHSU students who struggle to pass here and then take it at community college where it is generally easier to pass).
2. Discuss ways to increase the assessment of General Chemistry at the end of the course CHEM 1412, and how to more consistently use the ACS Gen Chem test (and measure more students). The Gen Chem instructors will be tasked with developing a plan during Fall 2024.
3. Dr. Haines, the CHEM 3438 lab instructor, will Increase the required review of Organic Chemistry at the beginning of the CHEM 3438 lab, where this assessment is carried out. These reviews are carried out in Blackboard Modules, which will be expanded for Fall 2024.
4. Results will be discussed with Organic instructors and our support partners (Academic Success Center tutor leaders, etc.) to raise awareness of the issue and discuss useful supports.
5. Dr. Haines will lead a faculty and staff discussion of the issue in Fall 2024 to determine if additional assessment and correction are appropriate. For example, a mandatory 1 credit hour course for majors in the department could be added during the junior year that more thoroughly assesses this knowledge (along with knowledge of General Chemistry), followed by mandatory corrective actions for those whose knowledge and skills do not meet standards. The pedagogical benefit must be weighed against the increased credit hours and cost, as well as consideration of what happens to students who fail to reach those standards even by the end of the course.

Knowledge in advanced classes required some help as well:

1. Dr. Haines will add an activity to CHEM 3438 to help students perform better writing protein structures, which is a task that depends heavily on organic chemistry knowledge combined with new understanding of amino acids developed in CHEM 3438.

2. Dr. Haines will discuss the observed dependence of Physical Chemistry grades on pre-requisite Calculus II grades, and the Physical Chemistry faculty will make a plan in Fall 2024 to help better support student knowledge/retention of calculus.

In recent years, student writing assessments have been very successful in our department, underscoring a heavy emphasis on developing writing skills. We increased the criteria due to the success, but multiple measures of student writing decreased this year. Therefore, we will:

1. Dr. Haines will work with his lab assistants in CHEM 3438 to speed up the grading so students get feedback in a more timely manner. It is believed that very slow feedback disrupted student learning and skill development this year.

Through this combination of activities, we hope to improve the efficacy of the education process, and help students achieve their goals.

Chemistry MS

Broad-Spectrum Expertise: Comprehensive Advanced Knowledge in Major Chemistry Subfields

Goal Description:

This goal is centered on cultivating well-rounded, extensive knowledge in the major subfields of chemistry for our MS Chemistry students. Recognizing the interdisciplinary nature of chemistry, our program ensures that students gain proficiency in at least four core areas: organic chemistry, analytical chemistry, physical chemistry, and inorganic chemistry, with optional exploration in biochemistry. This diverse curriculum is designed to build a deep, multifaceted understanding of the chemical sciences, preparing our graduates for the complex challenges and opportunities in their future careers.

Our approach aligns with the standards and expectations set forth by leading professional societies and industry experts. Students are required to engage in a rigorous selection of courses across these key areas, typically spanning a two-year period. Each academic year, we offer a suite of lectures in three to four of these areas, ensuring up-to-date and comprehensive coverage of the discipline. For example, last year's courses included Organic Chemistry, Analytical Chemistry, Inorganic Chemistry, and Biochemistry.

By completing these requirements, our students emerge as highly skilled chemists, equipped with the necessary knowledge to conduct impactful research, analyze data critically, and draw informed scientific conclusions. This broad academic foundation opens doors to a myriad of career paths, ranging from academia to industry, and underscores our commitment to producing well-versed, adaptable chemistry professionals. Further details on our degree plan and course requirements can be found in the SHSU Graduate Catalog at SHSU Chemistry MS Curriculum.

Providing Department: Chemistry MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Application of Advanced Chemistry Knowledge in Research

Learning Objective Description:

This learning objective aims to ensure that students in the MS Chemistry program not only acquire in-depth knowledge at the graduate level but also effectively apply this knowledge in their research endeavors. The key aspects of this objective include:

1. **Knowledge Retention and Integration**: Students are expected to retain critical information and concepts from their coursework, integrating this knowledge across various sub-disciplines of chemistry.
2. **Practical Application in Research**: The core focus is on the ability to apply theoretical knowledge to practical research scenarios. This involves using learned concepts to design experiments, solve complex problems, and innovate within their chosen field of study.
3. **Adaptability and Relevance**: Emphasis is placed on adapting academic knowledge to address real-world challenges. Students will learn to tailor their theoretical understanding to fit the unique demands and contexts of their research projects.
4. **Synthesis and Innovation**: Beyond mere application, students are encouraged to synthesize information from multiple areas of chemistry to foster innovation. This synthesis is critical in developing novel approaches and solutions in their research.

By achieving these objectives, our students will be well-equipped not only with a robust foundation in chemistry but also with the ability to apply their knowledge in meaningful and impactful ways, thus preparing them for a successful career in research and beyond.

RELATED ITEM LEVEL 2

Graduating MS Chemistry Students can Present (Defend) Their MS Thesis Work
Indicator Description:
This indicator assesses the proficiency of graduating MS Chemistry students in presenting and defending their thesis work. The assessment is twofold:

1. **Open Thesis Presentation**: The student presents their research in an open (public) forum, typically lasting about one hour, including a question-and-answer session. This presentation tests their ability to clearly communicate their research findings, engage with audience inquiries, and demonstrate a comprehensive understanding of their research topic.

2. **Closed Defense and Oral Examination**: Following the open presentation, a closed session is conducted with the student, the thesis committee, and any interested faculty. During this session, the student undergoes a detailed examination of their thesis work and related knowledge, which also serves as the oral comprehensive examination.

The assessment is based on a pass/fail criterion for both the open presentation and the closed examination. Though students typically pass both simultaneously, it is possible to pass one component while failing the other, as they are evaluated as separate entities. This dual assessment method provides a comprehensive evaluation of the student's research capabilities, presentation skills, and depth of subject knowledge.

Results will be collated by the Graduate Coordinator at the end of the academic year, considering Summer 2023, Fall 2023, and Spring 2023 graduates.

Criterion Description:
During their final semester, all students will present and defend their research at an acceptable level (to the approval of their committee) and pass their oral comprehensive examination. Last year, two students graduated with the MS in Chemistry (in the '22-23 academic year). Both passed their thesis defenses on the first try, so the criterion was met. However, one did have a very high number of corrections to the thesis itself and, along with a needed retake of the comprehensive exam, took an extra semester to graduate.

This year, with multiple changes incorporated to help students better prepare, the goal is for During their final semester, all students will present and defend their research at an acceptable level (to the approval of their committee) and pass their oral comprehensive examination ***on their first attempt***.

Findings Description:
This year we had three students graduate with an MS in Chemistry. All three passed their thesis defense (if thesis track) and oral comprehensive exam (all students, two received scores of 'pass' and one 'high passed') on the first attempt. Therefore, the criterion is met.

RELATED ITEM LEVEL 3

Action - Graduating MS Chem Defending Thesis
Action Description:
The criterion was met, continue to monitor next year.

RELATED ITEM LEVEL 2

Success in the Comprehensive Oral Examination: Knowledge and Application
Indicator Description:

This indicator evaluates the proficiency of MS Chemistry students in their Comprehensive Oral Examination, a key degree requirement. The assessment focuses on two core areas:

1. **Coursework Mastery**: Students are examined on the material covered in their coursework, assessing their retention, understanding, and ability to integrate knowledge across different areas of chemistry.

2. **Thesis and General Chemistry Knowledge**: The examination includes questions related to their thesis work, testing their depth of understanding and ability to apply coursework knowledge to their specific research area. Additionally, the exam assesses their general knowledge of chemistry, ensuring a well-rounded grasp of the field.

The exam is conducted by a panel of faculty members who are experts in various chemistry disciplines. The assessment criteria include the accuracy of responses, depth of understanding, and the ability to think critically and apply knowledge in a broader context.

Students must pass this oral examination to demonstrate their comprehensive understanding of chemistry and their readiness to contribute professionally in their field. The outcome of the exam is determined on a pass/fail basis, and students who do not pass on their first attempt will have opportunities for re-examination following further study and preparation.

Results for Summer 2023, Fall 2023, and Spring 2024 will be collated by the Graduate Coordinator in May 2024.

Criterion Description:

Last year's criterion was that all students attempting the comprehensive exam will pass by demonstrating sufficient knowledge in chemistry to their advisory committee. All students graduated that attempted the oral comprehensive examination this year, a total of 2 students. However, one student failed on the first attempt and had to be tested a second time. A new course was added to help graduate students be successful.

Therefore the new criterion will be that all students attempting the comprehensive exam will pass (on the first try) by demonstrating sufficient knowledge in chemistry to their advisory committee.

Findings Description:

Three students graduated in the past year (Fall '23, Spring '24, and Summer '24) and all three passed on the first attempt. The criterion is met.

RELATED ITEM LEVEL 3

Action - Passing of Comprehensive Oral Exam

Action Description:

The criterion was met. Continue to monitor in future cycles.

RELATED ITEM LEVEL 2

Thesis Prospectus Approval: Demonstrating Research Readiness and Chemistry Proficiency

Indicator Description:

This indicator evaluates the successful development and approval of a thesis prospectus by MS Chemistry students, signifying not only their aptitude in research planning but also their foundational knowledge in chemistry. The thesis prospectus is a critical document that includes:

1. **Project Explanation and Objectives**: The prospectus must articulate the research's purpose and expected outcomes, showcasing the student's ability to conceptualize a scientifically sound and meaningful project.

2. **Methodological Approach**: It should detail the chosen procedures and investigative methods, reflecting a well-structured and feasible research approach, underpinned by solid chemistry knowledge.
3. **Contextualizing Research**: The document needs to demonstrate an understanding of the study's relevance within the broader field, including an engagement with existing scholarly work, indicating a strong grasp of the subject matter.
4. **Resource and Feasibility Assessment**: A description of required materials and facilities confirms that the student has the practical understanding necessary to undertake the research.

Approval of the prospectus, evidenced by the Thesis Prospectus Approval Form, requires consent from the student's Advisory Committee, Department Chair, and COSET Dean. This approval is a testament to the student's comprehensive preparation, encompassing both the specific research plan and a baseline level of chemistry knowledge essential for conceptualizing and undertaking a chemistry research project.

All thesis-track students are expected to have their prospectus approved by the end of their fourth fall/spring semester, and at least one semester before defending their thesis, aligning with graduation timelines and confirming their readiness for the intensive research phase of their program. This step is not merely procedural but a pivotal milestone that underscores a student's readiness for significant research, backed by a robust understanding of chemical principles and methodologies.

Criterion Description:

A submitted and approved Thesis Prospectus Approval Form will serve to indicate whether a student's Thesis Prospectus has been approved. The Thesis Prospectus must be approved by the student's Advisory Committee, Department Chair, and COSET Dean. A prospectus is required of all students in a thesis track of the MS Chemistry, and 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer).

Although 100% of students last year did write a prospectus that passed committee, Chair, and COSET checks, so the criterion was met, there is an issue that needs action. A student rarely does it early enough for proper review before the COSET deadline, so the committee and Chair end up scrambling to read and evaluate the document (and do revision cycles with the student) before the deadline. This lowers the quality of the finished product and teaches students the wrong lesson.

Therefore, this year the criterion is that 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer) and 90% should do so before the official deadline the semester of submission (allowing for some emergency situations to go beyond the deadline).

Findings Description:

100% of students (three students) completed their thesis prospectus, but only one did before the formal deadline; two required extensions, so only 33% completed before the deadline. Therefore, the criterion is not met.

RELATED ITEM LEVEL 3

Action - Acceptable Thesis Prospectus

Action Description:

Students are able to eventually complete the thesis prospectus, but have a hard time doing so by the deadline. Therefore, the Graduate Coordinator and Department Chair will try to communicate better with students about the need to start earlier.

RELATED ITEM LEVEL 1

Students Should Be Able to Demonstrate Graduate-Level Chemistry Knowledge in the Subfield Physical Chemistry

Learning Objective Description:

Students should be able to demonstrate comprehensive graduate-level knowledge in Physical Chemistry by applying the laws of thermodynamics and thermochemistry to analyze and solve complex chemical problems. They should use computational chemistry tools, such as Gaussian, to model thermodynamic properties at the molecular level and predict system behaviors. Additionally, students will be expected to accurately interpret and critique spectroscopic and thermodynamic data, and effectively communicate their findings and analyses through detailed written reports and oral presentations.

RELATED ITEM LEVEL 2

Graduate-level knowledge in Physical Chemistry

Indicator Description:

To assess students' ability to demonstrate graduate-level knowledge in Physical Chemistry, we will use a combination of direct and indirect measures:

1. **Direct Measure:**
    - **Method:** Evaluation of Excel-based thermodynamic calculators constructed by students, including those for Carnot cycle analysis, phase diagrams, and QSPR models.
    - **Source of Data:** Project grades based on a detailed rubric assessing the accuracy, functionality, and clarity of the calculators.
    - **Rubric/Evaluation Scale:** The rubric will score projects on a scale of 0-100%, with specific criteria for correct calculations, appropriate use of formulas, clarity of instructions, and presentation of results.
    - **Frequency:** Data will be collected at the end of each major project submission.
    - **Evaluator:** The course instructor and a peer review panel will evaluate the projects, providing a comprehensive review of each student's work.
2. **Indirect Measure:**
    - **Method:** Student self-assessment surveys and course feedback forms.
    - **Source of Data:** Responses collected through a Likert scale survey (1-5) and open-ended questions regarding students' perceived understanding and confidence in applying physical chemistry principles.
    - **Frequency:** Surveys will be administered at mid-semester and end-of-semester.
    - **Evaluator:** The course instructor will review the survey results to identify trends and areas for improvement in instruction and course materials.

These indicators will provide a triangulated assessment of students' mastery of advanced physical chemistry concepts and their ability to apply these concepts to real-world problems.

Attached Files

47286329.pdf

Criterion Description:

There are two grades for this project, one for the presentation upload (20 pts) and one for the excel file itself (30 pts). It is expected that at least 90% of students will upload acceptable projects and earn at least 90% of the points (so a sum of 45/50).

Findings Description:

Eleven students took the course in Fall 2023. Of those, 100% of students earned at lest 90% of the points (in fact, all earned 100%). Therefore, the criterion is met; students can successfully create Excel files to carry out physical chemistry calculations at the graduate level.

RELATED ITEM LEVEL 1

Students Are Able to Take Courses From at Least Three Subfields of Chemistry Each Year
Performance Objective Description:
Offer a curriculum with appropriate discipline-specific knowledge.

RELATED ITEM LEVEL 2

Diverse Graduate Course Offerings in Chemistry Sub-disciplines
KPI Description:
his indicator assesses the availability and diversity of course offerings within the chemistry department, crucial for ensuring a well-rounded graduate education. The key elements of this indicator include:

1. **Course Scheduling and Availability**: The department chair, who is responsible for the course schedule, ensures that a comprehensive array of courses covering various sub-disciplines of chemistry is available to students each academic year. This planning is critical for providing students with the flexibility and opportunity to explore and specialize in different areas of chemistry.
2. **Coverage of Sub-disciplines**: The course offerings are structured to guarantee that students can enroll in classes across at least three different sub-disciplines of chemistry each year. This approach is designed to foster a broad-based understanding of the field, allowing students to gain exposure to and expertise in multiple areas, such as organic, inorganic, analytical, physical, and biochemistry.
3. **Curricular Responsiveness**: The department continuously evaluates and updates the course offerings to reflect evolving trends and advancements in the field of chemistry, ensuring that students receive an education that is both current and comprehensive.
4. **Access and Progression**: The scheduling is also tailored to facilitate timely progression through the program, allowing students to fulfill their curricular requirements within the expected timeframe of their graduate studies.

This indicator not only measures the department's ability to offer a diverse and comprehensive curriculum but also reflects its commitment to facilitating a well-rounded and advanced education in chemistry, catering to the varied interests and career aspirations of its graduate students.

The Chair will evaluate this for Fall 2023 and Spring 2024 in May 2024.

Target Description:
Each academic year, chemistry graduate students will be able to take coursework in at least three different sub-discipline areas of chemistry.

Results Description:
In Fall 2024, the department offered:

- The Physical Chemistry course CHEM 5381 Adv Physl Chem Thermodynamics
- The Analytical Chemistry course CHEM 5385 Selected Topics in Adv Chem: Structure Spectroscopic Methods

In Spring 2024, the department offered:

- The Organic Chemistry course CHEM 5385 Selected Topics in Adv Chem: Organic Reactions & Synthesis
- The Analytical Chemistry course CHEM 5367 Chemical Nano Sensing

Since these courses span at least three areas of chemistry, the criterion is met.

RELATED ITEM LEVEL 3

Action - Graduate Course Offerings
Action Description:
The criterion was met, continue to evaluate next year. The Faculty and Staff will discuss possible changes to the program as well next year, so this should be monitored closely if changes are made to course scheduling.

Excellence in Communication: Articulating Scientific Insights

Goal Description:
This goal underscores the paramount importance of oral and written communication skills for MS Chemistry students, essential for their success in diverse professional arenas. Effective communication is not just about conveying information; it's about translating complex chemical concepts into clear, understandable language for various audiences, including colleagues, clients, and non-specialists. Our program prioritizes developing these skills, recognizing that strong communicators are better equipped to collaborate with interdisciplinary teams, present findings compellingly, and influence decision-making processes.

We emphasize the importance of articulate and persuasive oral communication for presentations and interpersonal interactions. Concurrently, we focus on honing students' ability to write with clarity and precision, which is crucial for publishing impactful research papers, crafting compelling grant proposals, and contributing meaningfully to scientific discourse. Our curriculum and pedagogy are designed to provide numerous opportunities for students to practice and refine these skills, ensuring that they graduate not only as skilled chemists but also as effective communicators who can lead conversations in their field and beyond.

Providing Department: Chemistry MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Excellence in Scientific Presentation: From Concept to Delivery
Learning Objective Description:
This learning objective targets the development of superior presentation skills in our MS Chemistry students, recognizing the critical importance of effective oral communication in scientific careers. The objective encompasses several key components:

1. **Planning and Organization**: Students will learn to structure their presentations logically, ensuring a clear and coherent flow of ideas from introduction to conclusion.
2. **Visual Design**: Emphasis will be placed on creating impactful visual aids. This includes designing slides or other visual materials that effectively complement and enhance the oral narrative, ensuring that they are not only informative but also engaging.
3. **Audience Engagement**: Students will practice techniques to captivate and maintain the audience's interest throughout the presentation, adapting their delivery style to suit different audiences and settings.

4. **Clear and Concise Delivery**: The ability to present complex research findings in an accessible and understandable manner is a focal point. This involves mastering the art of storytelling in science, making intricate concepts accessible to a diverse audience.

Students will have opportunities to demonstrate these skills in various settings, including during the completion of CHEM 5100 and at their thesis defense. Some will present their research project at on-campus or external scientific meetings. These experiences are designed to build confidence and proficiency in presenting their research findings, preparing them for successful communication in academic and professional spheres.

RELATED ITEM LEVEL 2

Acceptable Student Seminar Peer-Reviewed Presentation
Indicator Description:
All graduate students in chemistry are required to take CHEM 5100 (Chemistry Literature and Seminar) at least once during their tenure as graduate students. To pass CHEM 5100, students are required to receive an acceptable peer-rating on a required research presentation. The faculty, with the assistance of the peer-review evaluation rubric, will determine the presentation's acceptability.

Criterion Description:
It is expected that greater than 90% of the students give an acceptable full-length presentation.

Attached Files
Spring_2022_20821.pdf
Findings Description:
Out of the 39 presentations during the 2023-2024 academic year, only one presentation was deemed to be unacceptable. The criterion was met.

RELATED ITEM LEVEL 3

Action - Acceptable Student Seminar Peer-Reviewed Presentation
Action Description:
The seminar courses are being taken over by a new instructor, Dr. Christopher Zall, so we will keep the same assessment next cycle and watch for any significant changes in evaluation.

RELATED ITEM LEVEL 2

Graduating MS Chemistry Students can Present (Defend) Their MS Thesis Work
Indicator Description:
This indicator assesses the proficiency of graduating MS Chemistry students in presenting and defending their thesis work. The assessment is twofold:

1. **Open Thesis Presentation**: The student presents their research in an open (public) forum, typically lasting about one hour, including a question-and-answer session. This presentation tests their ability to clearly communicate their research findings, engage with audience inquiries, and demonstrate a comprehensive understanding of their research topic.

2. **Closed Defense and Oral Examination**: Following the open presentation, a closed session is conducted with the student, the thesis committee, and any interested faculty. During this session, the student undergoes a detailed examination of their thesis work and related knowledge, which also serves as the oral comprehensive examination.

The assessment is based on a pass/fail criterion for both the open presentation and the closed examination. Though students typically pass both simultaneously, it is possible to pass one component while failing the other, as they are evaluated as separate entities. This dual assessment method provides a comprehensive evaluation of the student's research capabilities, presentation skills, and depth of subject knowledge.

Results will be collated by the Graduate Coordinator at the end of the academic year, considering Summer 2023, Fall 2023, and Spring 2023 graduates.

Criterion Description:

During their final semester, all students will present and defend their research at an acceptable level (to the approval of their committee) and pass their oral comprehensive examination. Last year, two students graduated with the MS in Chemistry (in the '22-23 academic year). Both passed their thesis defenses on the first try, so the criterion was met. However, one did have a very high number of corrections to the thesis itself and, along with a needed retake of the comprehensive exam, took an extra semester to graduate.

This year, with multiple changes incorporated to help students better prepare, the goal is for During their final semester, all students will present and defend their research at an acceptable level (to the approval of their committee) and pass their oral comprehensive examination ***on their first attempt***.

Findings Description:

This year we had three students graduate with an MS in Chemistry. All three passed their thesis defense (if thesis track) and oral comprehensive exam (all students, two received scores of 'pass' and one 'high passed') on the first attempt. Therefore, the criterion is met.

RELATED ITEM LEVEL 3

Action - Graduating MS Chem Defending Thesis

Action Description:

The criterion was met, continue to monitor next year.

RELATED ITEM LEVEL 1

Proficiency in Writing Extensive Scientific Documents (Books, Major Reports, and Theses)

Learning Objective Description:

This learning objective is tailored to advance students' proficiency in writing extensive, detailed scientific documents, with a specific focus on adhering to the American Chemistry Society's (ACS) style guide. The thesis serves as a practical framework for achieving this objective, serving as an example of a very large and detailed document like a book and as a learning opportunity fo the students, encompassing the following key elements:

1. **Adherence to ACS Style Guide**: Students will become adept at following the ACS style guide, which is known for its comprehensive and detailed guidelines. This practice will ensure that their theses and other scientific writings meet the highest standards of scholarly communication in chemistry.
2. **Thesis as a Model for Complex Writing**: The process of composing a thesis provides an ideal opportunity for students to apply these guidelines in a real-world context, helping them learn the intricacies of structuring and presenting substantial research according to professional standards.
3. **Enhanced Depth and Analysis**: Through the rigorous process of thesis writing, students will engage in higher-level thinking, critically analyzing their experimental results and understanding their broader implications in the field of chemistry. This includes a deep dive into the interpretation of data, synthesis of findings, and exploration of the wider impact of their research.

4. **Clarity in Writing for a Professional Audience:** The thesis is written for an audience of chemistry professionals, providing an opportunity to hone communication skills for this highly technical audience.
5. **Versatility in Scientific Documentation**: Beyond the thesis, students will be prepared to apply these skills to a variety of scientific documents, including major reports and scholarly books, adapting their approach to suit different formats and audiences.

Ultimately, the objective is to cultivate a generation of chemists who are not only skilled in conducting and documenting research but also capable of insightful analysis and interpretation of their findings, contributing meaningfully to the scientific discourse and the broader understanding of chemical sciences.

RELATED ITEM LEVEL 2

Thesis Prospectus Approval: Demonstrating Research Readiness and Chemistry Proficiency
Indicator Description:
This indicator evaluates the successful development and approval of a thesis prospectus by MS Chemistry students, signifying not only their aptitude in research planning but also their foundational knowledge in chemistry. The thesis prospectus is a critical document that includes:

1. **Project Explanation and Objectives**: The prospectus must articulate the research's purpose and expected outcomes, showcasing the student's ability to conceptualize a scientifically sound and meaningful project.
2. **Methodological Approach**: It should detail the chosen procedures and investigative methods, reflecting a well-structured and feasible research approach, underpinned by solid chemistry knowledge.
3. **Contextualizing Research**: The document needs to demonstrate an understanding of the study's relevance within the broader field, including an engagement with existing scholarly work, indicating a strong grasp of the subject matter.
4. **Resource and Feasibility Assessment**: A description of required materials and facilities confirms that the student has the practical understanding necessary to undertake the research.

Approval of the prospectus, evidenced by the Thesis Prospectus Approval Form, requires consent from the student's Advisory Committee, Department Chair, and COSET Dean. This approval is a testament to the student's comprehensive preparation, encompassing both the specific research plan and a baseline level of chemistry knowledge essential for conceptualizing and undertaking a chemistry research project.

All thesis-track students are expected to have their prospectus approved by the end of their fourth fall/spring semester, and at least one semester before defending their thesis, aligning with graduation timelines and confirming their readiness for the intensive research phase of their program. This step is not merely procedural but a pivotal milestone that underscores a student's readiness for significant research, backed by a robust understanding of chemical principles and methodologies.

Criterion Description:
A submitted and approved Thesis Prospectus Approval Form will serve to indicate whether a student's Thesis Prospectus has been approved. The Thesis Prospectus must be approved by the student's Advisory Committee, Department Chair, and COSET Dean. A prospectus is required of all students in a thesis track of the MS Chemistry, and 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer).

Although 100% of students last year did write a prospectus that passed committee, Chair, and COSET checks, so the criterion was met, there is an issue that needs action. A student rarely does it early enough for proper review before the COSET deadline, so the committee and Chair end up scrambling to read and evaluate the document (and do revision cycles with the student) before the deadline. This lowers the quality of the finished product and teaches students the wrong lesson.

Therefore, this year the criterion is that 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer) and 90% should do so before the official deadline the semester of submission (allowing for some emergency situations to go beyond the deadline).

Findings Description:

100% of students (three students) completed their thesis prospectus, but only one did before the formal deadline; two required extensions, so only 33% completed before the deadline. Therefore, the criterion is not met.

RELATED ITEM LEVEL 3

Action - Acceptable Thesis Prospectus

Action Description:

Students are able to eventually complete the thesis prospectus, but have a hard time doing so by the deadline. Therefore, the Graduate Coordinator and Department Chair will try to communicate better with students about the need to start earlier.

RELATED ITEM LEVEL 2

Thesis Writing Proficiency: Adherence to ACS Guidelines and Scholarly Standards

Indicator Description:

This indicator evaluates the ability of graduating MS Chemistry students to produce a high-quality thesis that meets academic and professional standards. Key aspects of this indicator include:

1. **Thesis Format and Style**: The thesis must be written following the scientific writing format and adhere strictly to the style guidelines set by the American Chemical Society (ACS). This ensures consistency, professionalism, and adherence to recognized scholarly norms.

2. **Evaluation Process**: The thesis will be thoroughly evaluated by the student's advisory committee, the Dean of the College of Science and Engineering Technology (COSET), and the Graduate School.

3. **Assessment Criteria**: The evaluation will focus on various criteria, including clarity of writing, logical structuring of content, accuracy and depth of research, proper citation and referencing, and overall adherence to ACS guidelines.

4. **Outcome Measures**: The thesis will be assessed on a pass/fail basis. To pass, the thesis must meet all specified criteria, demonstrating the student’s proficiency in presenting a well-researched, coherently written, and professionally formatted scientific document.

5. **Feedback and Improvement**: Constructive feedback will be provided to students, especially in cases where revisions are required, guiding them to improve their scientific writing skills.

This comprehensive evaluation process ensures that each thesis reflects a high standard of academic research and writing, essential for the professional development of students in the field of chemistry.

The Graduate Coordinator will collate the results for Summer 2023, Fall 2023, and Spring 2024 in May 2024.

Criterion Description:

All student will work with their research advisors to write an acceptable thesis.

Findings Description:

Of the three students that graduated, all wrote thesis that were of the approved format. The criterion was met.

RELATED ITEM LEVEL 3

Action - Writing a Thesis

Action Description:

The criterion was met, continue to evaluate next cycle.

RELATED ITEM LEVEL 1

Students Present and Publish the Results of Their Research

Performance Objective Description:

The effective communication of science is a skill students need to develop. Publication of their work in national and international journals and presentation at professional meetings will allow students to gain or improve these skills. These activities will also help to raise the visibility of the department.

RELATED ITEM LEVEL 2

Research Publications by Graduate Students

KPI Description:

KPI Objective: To ensure effective training and experience in research dissemination for graduate students by aiming for each MS Chemistry graduate to have at least one publication (in print, accepted, or near submission) by the time of their graduation.

Indicator and Methodology:

- **Primary Indicator**: The principal metric for this KPI is the number of research publications authored or co-authored by graduate students, especially as part of their MS degree completion.
- **Publication Expectation and Tracking**: Set an expectation that all graduate students will contribute to at least one research publication by the time they complete their MS degree. Track publications in print, accepted, or in the final stages of submission by seeking input from the graduate faculty mentors.
- **Addressing Publication Lag**: Acknowledge and address the time lag inherent in the publication process. Consider including manuscripts that are under review or in preparation as part of the KPI, to more accurately reflect students' research productivity and efforts.
- **Support and Resources for Publication**: Provide adequate support and resources to graduate students for research writing and publication. This can include workshops on scientific writing, guidance on publication processes, and mentorship from faculty.
- **Monitoring and Reporting System**: Implement a system to monitor and report the publication status of graduate students' research by checking with the faculty research mentors of graduating students.

Expected Outcomes:

- Increased number of research publications by MS Chemistry students.
- Enhanced research dissemination skills among graduate students, preparing them for successful careers in academia, industry, or government.
- Continuous adaptation and improvement of the publication support system to meet the evolving needs of graduate students.

Through this KPI, the Chemistry Department commits to fostering a strong research publication culture among its graduate students, ensuring they are well-prepared for professional success and contributing to the department's scholarly output.

Target Description:

100% of graduate students who complete their M.S. degrees will have one or more publications in print, accepted, or near submission.

Results Description:

In the absence of a good system for tracking manuscripts near submission, this was not possible to assess. Therefore, the Chair will create a system for reporting and re-assess next year.

RELATED ITEM LEVEL 3

Action - Research Publications by Students

Action Description:

The Chair will create a system for reporting and re-assess next year.

RELATED ITEM LEVEL 2

Student Presentations at Professional Meetings

KPI Description:

KPI Objective: To ensure that all graduate students in the Chemistry Department gain experience in orally presenting their research at regional or national professional meetings, thereby demonstrating the department's success in preparing students for effective scientific communication.

Indicator and Methodology:

- **Primary Indicator**: The key metric for this KPI is the number of presentations made by graduate students at professional meetings during their MS program, with an expectation that every graduate student will have made at least one presentation at such a forum.
- **Scope of Meetings**: Include presentations at a variety of professional meetings, such as American Chemical Society (ACS) Meetings, Society of Toxicology, and other relevant scientific conferences.
- **Tracking and Reporting**: Implement a system to track the participation of graduate students in professional meetings, including details about the events, nature of the presentations, and feedback received.
- **Support and Preparation**: Provide support and training for graduate students in developing and delivering effective presentations. This could include workshops on presentation skills, practice sessions, and mentorship from faculty.

Expected Outcomes:

- An increase in the number of graduate student presentations at professional meetings, fulfilling the department’s expectation for student participation.
- Enhanced skills in scientific communication among graduate students, preparing them for successful careers in academia, industry, or government.
- Recognition of the department’s commitment to professional development and student success in research dissemination.

Through this KPI, the Chemistry Department is committed to actively supporting and tracking graduate student presentations at professional meetings, ensuring that they are well-equipped to communicate their research effectively and engage with the scientific community.

Target Description:

100% of MS degree graduates will have at least one conference presentation at a regional or national meeting at the time of graduation. This same KPI and target was used last year, and was successfully met (but there were only two graduating students).

Results Description:

100% of students had at least one presentation, the target was met.

RELATED ITEM LEVEL 3

Action - Student Presentations at Professional Meetings

Action Description:

Continue to assess next year.

Mastery in Carrying Out Research: Safety, Effectiveness, and Advanced Application

Goal Description:

At the heart of our MS Chemistry program is the goal to equip students with the ability to apply advanced graduate-level chemistry knowledge in the hands-on practice of chemistry, seamlessly integrating theoretical understanding with practical application. This goal underscores the necessity for our graduates to not only conduct research safely and effectively but also to demonstrate a profound depth of chemical knowledge in their experimental work. Our students are expected to exhibit a mastery of advanced chemical concepts and techniques, applying this expertise to design and execute complex research projects. This involves developing a nuanced understanding of laboratory safety protocols, ensuring accuracy, reliability, and integrity in experimental outcomes. Additionally, our graduates are trained to efficiently navigate research challenges within specified timeframes and budgets, a critical skill in diverse chemistry-related careers, including research and development, pharmaceuticals, and materials science. A significant aspect of this goal is fostering the ability to articulate clear research objectives, employ the scientific method with precision, and contribute new insights or innovative approaches to the field. By focusing on the advanced application of chemistry knowledge in practical settings, we aim to cultivate a generation of chemists who are not only skilled researchers but also innovators and thought leaders in the scientific community.

Providing Department: Chemistry MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Comprehensive Safety in Research: Hazard Identification, Risk Assessment, and Mitigation While Practicing Research

Learning Objective Description:

This learning objective is dedicated to ensuring that students in the MS Chemistry program develop a thorough understanding and practice of safety protocols in research environments. The key components of this objective encompass:

1. **Hazard Recognition**: Students will be trained to identify potential hazards in the laboratory, understanding the nature and source of various chemical and procedural risks.
2. **Risk Assessment**: Building on hazard recognition, students will learn to assess the level of risk associated with different hazards. This includes evaluating the potential impact and likelihood of hazard occurrences.
3. **Risk Minimization**: A critical skill is the ability to implement strategies and procedures to minimize the risks associated with identified hazards. This involves choosing appropriate safety equipment, modifying experimental procedures, and adhering to best safety practices.
4. **Emergency Preparedness**: Students will also be equipped with the knowledge and skills to respond effectively to emergencies arising from uncontrolled hazards. This includes understanding emergency procedures, using safety equipment, and knowing how to mitigate the effects of accidents.
5. **Awareness of Regulations:** To ensure safety, many regulations and safety protocols exist in any given research setting. As students work in these research settings, they should be aware of the

relevant safety regulations and protocols and be able to follow them to ensure regulatory compliance.

6. **Practical Application in Research Projects**: Importantly, students will regularly practice these safety skills and requirements as an integral part of their research projects, ensuring that safety considerations are seamlessly integrated into their scientific workflow.

Through this comprehensive approach to laboratory safety, our students will not only conduct research with the highest standards of safety but also cultivate a deep-rooted culture of safety awareness and responsibility in their scientific careers.

RELATED ITEM LEVEL 2

Successful Completion of CHEM6398: A Benchmark of Research Progress

Indicator Description:

This indicator assesses whether MS Chemistry students have achieved significant progress in their research, as evidenced by successful completion of the research course, CHEM6398. The rationale and significance of this measure are as follows:

1. **Research Progress Benchmark**: Completion of CHEM6398 is a critical milestone, indicating that the student has made substantial progress in their research, which is essential for the development of their thesis. It serves as a tangible measure of the student's ability to conduct sustained, in-depth research in the field of chemistry.

2. **Grade Assignment Criteria**: The grade for CHEM6398 is assigned upon the completion of the research component of the student's thesis. This grade reflects not just the completion of tasks but also the quality and depth of the research conducted, including data collection, analysis, and preliminary findings.

3. **Significance**: Successfully completing this course signifies that the student is on track for the timely completion of their thesis. It also demonstrates their capability to engage in rigorous scientific inquiry, manage a complex research project, and contribute new knowledge or perspectives to their field.

4. **Evaluation by Faculty**: The grade is determined by faculty members who are closely involved in guiding and evaluating the student's research. This ensures that the assessment is both rigorous and reflective of the student's research skills and academic growth. They report the grade to the Chair, who formally is instructor of record for the course and enters that grade.

The successful completion of CHEM6398 is thus a crucial indicator of a student's readiness to advance to the final stages of their thesis work, underscoring their development as a competent and independent researcher.

The Chair will summarize CHEM 6398 grades for Summer 2023, Fall 2023, and Spring 2024 in May 2024.

Criterion Description:

Success will be indicated by all graduate students receiving a passing grade in the Graduate Research in Chemistry (CHEM6398) course. This grade is typically an A and is assigned once the research project has been completed.

Last year, two students graduated, and both students who graduated had been evaluated as successfully completing their MS thesis project research (and given an A in CHEM 6398), as well as two students who are expected to defend theses and graduate in the upcoming students. The criterion was met.

This year, the grading and timing of CHEM 6398 changed slightly. Therefore, the new criterion is that of students receiving an A, B, C, or F in CHEM 6398, 100% will receive grades of A.

Findings Description:

In Fall 2023, one student took the course and received a grade of 'A'

In Spring 2024, one student took the course. She was a new student and had significant issues that kept her from completing her tasks, and was assigned an incomplete (grade of 'X') to give her more time to complete the course. At this time, then, she is not a student receiving an A,B,C, or F.

Summer 2024 grades are not yet available.

Therefore, one student received a grade of A, B, C, or F and received an A, so the criterion is met.

RELATED ITEM LEVEL 3

Action - Completion of Research Course

Action Description:

The criterion was met, but with only one student to measure. Therefore, more data should be evaluated and this assessment should be used again next cycle.

RELATED ITEM LEVEL 1

Proficiency in Experimental Research: Planning, Execution, and Analysis

Learning Objective Description:

This learning objective is designed to ensure that students in the MS Chemistry program attain mastery in the three foundational aspects of experimental research: planning, execution, and analytical evaluation. Students will:

1. **Plan**: Develop the ability to design comprehensive and methodical experimental plans. This includes formulating hypotheses, selecting appropriate methodologies, and preparing necessary materials and protocols in anticipation of various outcomes.
2. **Perform**: Gain hands-on expertise in conducting experiments with precision and adherence to safety protocols. This involves effectively managing resources, navigating experimental challenges, and maintaining a high standard of accuracy and repeatability in laboratory practices.
3. **Analyze**: Enhance skills in critically analyzing experimental data. Students will learn to interpret results, draw valid conclusions, and suggest future research directions based on their findings. This also encompasses the ability to use statistical tools and software for data processing and presentation.

By achieving proficiency in these areas, students will be well-equipped to conduct high-quality research and contribute valuable insights to the field of chemistry.

RELATED ITEM LEVEL 2

Successful Completion of CHEM6398: A Benchmark of Research Progress

Indicator Description:

This indicator assesses whether MS Chemistry students have achieved significant progress in their research, as evidenced by successful completion of the research course, CHEM6398. The rationale and significance of this measure are as follows:

1. **Research Progress Benchmark**: Completion of CHEM6398 is a critical milestone, indicating that the student has made substantial progress in their research, which is essential for the development of their thesis. It serves as a tangible measure of the student’s ability to conduct sustained, in-depth research in the field of chemistry.

2. **Grade Assignment Criteria**: The grade for CHEM6398 is assigned upon the completion of the research component of the student's thesis. This grade reflects not just the completion of tasks but also the quality and depth of the research conducted, including data collection, analysis, and preliminary findings.
3. **Significance**: Successfully completing this course signifies that the student is on track for the timely completion of their thesis. It also demonstrates their capability to engage in rigorous scientific inquiry, manage a complex research project, and contribute new knowledge or perspectives to their field.
4. **Evaluation by Faculty**: The grade is determined by faculty members who are closely involved in guiding and evaluating the student's research. This ensures that the assessment is both rigorous and reflective of the student's research skills and academic growth. They report the grade to the Chair, who formally is instructor of record for the course and enters that grade.

The successful completion of CHEM6398 is thus a crucial indicator of a student's readiness to advance to the final stages of their thesis work, underscoring their development as a competent and independent researcher.

The Chair will summarize CHEM 6398 grades for Summer 2023, Fall 2023, and Spring 2024 in May 2024.

Criterion Description:

Success will be indicated by all graduate students receiving a passing grade in the Graduate Research in Chemistry (CHEM6398) course. This grade is typically an A and is assigned once the research project has been completed.

Last year, two students graduated, and both students who graduated had been evaluated as successfully completing their MS thesis project research (and given an A in CHEM 6398), as well as two students who are expected to defend theses and graduate in the upcoming students. The criterion was met.

This year, the grading and timing of CHEM 6398 changed slightly. Therefore, the new criterion is that of students receiving an A, B, C, or F in CHEM 6398, 100% will receive grades of A.

Findings Description:

In Fall 2023, one student took the course and received a grade of 'A'

In Spring 2024, one student took the course. She was a new student and had significant issues that kept her from completing her tasks, and was assigned an incomplete (grade of 'X') to give her more time to complete the course. At this time, then, she is not a student receiving an A,B,C, or F.

Summer 2024 grades are not yet available.

Therefore, one student received a grade of A, B, C, or F and received an A, so the criterion is met.

RELATED ITEM LEVEL 3

Action - Completion of Research Course

Action Description:

The criterion was met, but with only one student to measure. Therefore, more data should be evaluated and this assessment should be used again next cycle.

RELATED ITEM LEVEL 2

Thesis Prospectus Approval: Demonstrating Research Readiness and Chemistry Proficiency

Indicator Description:

This indicator evaluates the successful development and approval of a thesis prospectus by MS Chemistry students, signifying not only their aptitude in research planning but also their foundational knowledge in chemistry. The thesis prospectus is a critical document that includes:

1. **Project Explanation and Objectives**: The prospectus must articulate the research's purpose and expected outcomes, showcasing the student's ability to conceptualize a scientifically sound and meaningful project.
2. **Methodological Approach**: It should detail the chosen procedures and investigative methods, reflecting a well-structured and feasible research approach, underpinned by solid chemistry knowledge.
3. **Contextualizing Research**: The document needs to demonstrate an understanding of the study's relevance within the broader field, including an engagement with existing scholarly work, indicating a strong grasp of the subject matter.
4. **Resource and Feasibility Assessment**: A description of required materials and facilities confirms that the student has the practical understanding necessary to undertake the research.

Approval of the prospectus, evidenced by the Thesis Prospectus Approval Form, requires consent from the student's Advisory Committee, Department Chair, and COSET Dean. This approval is a testament to the student's comprehensive preparation, encompassing both the specific research plan and a baseline level of chemistry knowledge essential for conceptualizing and undertaking a chemistry research project.

All thesis-track students are expected to have their prospectus approved by the end of their fourth fall/spring semester, and at least one semester before defending their thesis, aligning with graduation timelines and confirming their readiness for the intensive research phase of their program. This step is not merely procedural but a pivotal milestone that underscores a student's readiness for significant research, backed by a robust understanding of chemical principles and methodologies.

Criterion Description:

A submitted and approved Thesis Prospectus Approval Form will serve to indicate whether a student's Thesis Prospectus has been approved. The Thesis Prospectus must be approved by the student's Advisory Committee, Department Chair, and COSET Dean. A prospectus is required of all students in a thesis track of the MS Chemistry, and 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer).

Although 100% of students last year did write a prospectus that passed committee, Chair, and COSET checks, so the criterion was met, there is an issue that needs action. A student rarely does it early enough for proper review before the COSET deadline, so the committee and Chair end up scrambling to read and evaluate the document (and do revision cycles with the student) before the deadline. This lowers the quality of the finished product and teaches students the wrong lesson.

Therefore, this year the criterion is that 100% of students should pass the step by the end of their fourth fall/spring semester in the program (since many students graduate in the subsequent summer) and 90% should do so before the official deadline the semester of submission (allowing for some emergency situations to go beyond the deadline).

Findings Description:

100% of students (three students) completed their thesis prospectus, but only one did before the formal deadline; two required extensions, so only 33% completed before the deadline. Therefore, the criterion is not met.

RELATED ITEM LEVEL 3

Action - Acceptable Thesis Prospectus

Action Description:

Students are able to eventually complete the thesis prospectus, but have a hard time doing so by the deadline. Therefore, the Graduate Coordinator and Department Chair will try to communicate better with students about the need to start earlier.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

In the big picture, the findings suggested that some things assessed were on track, but some significant issues were revealed that needed attention:

- The major issue requiring action is student knowledge of chemistry prerequisite to graduate school and knowledge gained in their graduate lecture courses. This has been observed to be a huge problem, and half of the students received low enough grades to lose good standing last year. Assessments of student knowledge and skills specific to several different graduate offerings either failed to meet or barely met criteria with qualifying negative aspects to be addressed.
    - A new graduate course will be offered to students in their first semester focussed on better supporting graduate student success with assessments of prerequisite knowledge (giving American Chemical Society standardized exams in the five major areas of chemistry and were scores are low a mentor-assisted corrective plan will be undertaken) and lessons expectations of successful graduate students and best practices to get the most out o graduate school. [Dr. Gross and the other instructors in this team-taught course.]
    - Some part of this is likely due to post-COVID learning loss more generally. That part will likely improve with time, but as noted above, we are planning major action to support students moving forward with the new course and related interventions listed below.
- In general, students were able to successfully carry out research, write a Thesis Prospectus outlining their proposed research, and complete their research safely. However, a couple of changes are warranted:
    - Students are underestimating the time it takes to write a Prospectus of sufficient quality, so work needs to be done to encourage them to start and finish earlier, allowing them to get more detailed and effective feedback [Dr. Gross and all research advisors]
    - Assessment of the successful completion of the projects went well, but in the future, we should design an assessment that better measures how *safely* they work in the lab. There have not been any significant safety issues that we are aware of, but a better assessment tool may still be enlightening. [Dr. Gross, Dr. Haines]
- Student communication was evaluated as effective, generally.
    - The seminar presentation assessment findings were different from past semesters. This was mostly due to students who were not prepared for graduate studies and did not make it past their first semester. The new graduate course describe above should help with this in future semesters.
    - Although students were successful in writing and defending theses, there were issues to be addressed. As part of the new first semester graduate-student-success course described above, lessons on writing and defending the thesis will be taught. [Dr. Gross and the other instructors in this team-taught course.]
    - Not all students were getting manuscripts published in the literature, so more work to try to maximize the number of students getting this experience will be needed. [All faculty.]

Update of Progress to the Previous Cycle's PCI:

In the prior plan for continuous improvement, several issues were identified to examine or change:

- The major issue requiring action was student knowledge of chemistry prerequisite to graduate school and knowledge gained in their graduate lecture courses. T
    - A new graduate course was offered to students in their first semester focussed on better-supporting graduate student success with assessments of prerequisite knowledge (giving American Chemical Society standardized exams in the five major areas of chemistry and were scores are low a mentor-assisted corrective plan will be undertaken) and expectations of successful graduate students and best practices to get the most out o graduate school. [Dr. Gross and the other instructors in this team-taught course.] It was found that students bombed the ACS tests in general, and Dr. Gross had to adapt and focus on General Chemistry knowledge and testing.
- In general, students could successfully carry out research, write a Thesis Prospectus outlining their proposed research, and complete their research safely. However, a couple of changes were warranted:
    - Work was done to encourage students to start and finish their thesis prospectus earlier, allowing them to get more detailed and effective feedback. However, students still struggle, and more work needs to be done.
    - The safety assessment mentioned in the PCI was not developed, and remains work that should be completed.
- Student communication was generally evaluated as effective.
    - The first-semester graduate course was offered and did help students in this area.
    - Not all students were getting manuscripts published in the literature, so more work was suggested to try to maximize the number of students getting this experience will be needed. This remains an issue to work on.

New Plan for Continuous Improvement (MS Chemistry)

Closing Summary:

The MS in Chemistry program at Sam Houston State University is committed to maintaining high standards of graduate education and fostering continuous improvements based on assessment data. The following actions outline how we will achieve this:

1. **Improving Student Thesis Defense**
    - **Current Action:** Graduating MS students successfully defend their thesis as part of their program requirements.
    - **Continuous Improvement Plan:** Regularly review thesis defense formats, expectations, and evaluation criteria to ensure alignment with current scientific standards and practices. Feedback from defense committees will be analyzed by the Graduate Coordinator each academic year to identify areas where students commonly struggle, allowing for targeted interventions, such as enhanced mentoring and additional thesis preparation workshops.
2. **Enhancing Success in the Comprehensive Oral Examination**
    - **Current Action:** Students must pass a comprehensive oral examination, demonstrating knowledge across chemistry subfields.
    - **Continuous Improvement Plan:** Annual analysis of examination performance will be conducted to identify topics or concepts that consistently challenge students. This data will inform curriculum adjustments or supplemental instruction. Faculty will also engage in workshops to ensure that examination questions remain rigorous and reflective of current trends in the discipline.
3. **Strengthening Thesis Prospectus Approval Process**
    - **Current Action:** Approval of a student's thesis prospectus signifies research readiness and proficiency in chemistry.

- **Continuous Improvement Plan:** Faculty will annually review the prospectus approval process, incorporating peer-review mechanisms and student feedback. This will help ensure that students are receiving timely, constructive feedback and are better prepared to embark on their thesis research. Clearer guidelines for the prospectus will be distributed to improve proposal writing and understanding of expectations.

4. **Ensuring Course Diversity Across Chemistry Subfields**
    - **Current Action:** Students are required to take courses across at least three subfields of chemistry each academic year.
    - **Continuous Improvement Plan:** The Department Chair and Graduate Coordinator will assess course offerings to ensure a diverse selection that reflects the evolving field of chemistry. Student feedback on course relevance and faculty input will guide adjustments in course scheduling and the introduction of new, cutting-edge topics.
5. **Improving Seminar Presentations and Peer-Reviewed Communication**
    - **Current Action:** MS students present peer-reviewed seminars on their research.
    - **Continuous Improvement Plan:** Peer-reviewed seminars will undergo enhanced evaluation to provide more detailed feedback on both scientific content and presentation skills. Students will also be encouraged to attend workshops on scientific communication to improve their presentation skills further, and external seminar speakers will be brought in to model professional research presentations.
6. **Promoting Research Publications and Conference Presentations**
    - **Current Action:** Students are expected to publish research and present findings at professional meetings.
    - **Continuous Improvement Plan:** The department will track publication and presentation rates Faculty mentors will guide students more actively in selecting appropriate journals and conferences, as well as navigating the peer-review process. Annual department events and communications will highlight student achievements to encourage broader participation.
7. **Advancing Experimental Research and Safety Proficiency**
    - **Current Action:** Students must complete CHEM6398, demonstrating research proficiency and safety.
    - **Continuous Improvement Plan:** Annual reviews of CHEM6398 will ensure it remains comprehensive and aligned with current research standards and safety protocols. The program will update safety training modules as new hazards and regulations emerge. Additionally, students will be given opportunities to participate in safety workshops and certification programs.

By implementing these strategies, we aim to ensure that the MS in Chemistry program not only meets but exceeds academic and professional standards. Continuous feedback loops, faculty development, and student support mechanisms will remain central to our improvement efforts.

Department of Computer Science

Computing and Data Science MS

Technical Competence - To Develop And Demonstrate Knowledge Of Theoretical Materials, And Computational And Technical Skills

Goal Description:

Graduates with a master degree in Computing and Data Science will have a strong technical foundation, that is, to develop and demonstrate knowledge of theoretical materials, and computational and technical skills in the areas of Computing and Information Science.

Providing Department: Computing and Data Science MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Understand The Body Of Knowledge Of Computer Science And Information Technologies

Learning Objective Description:

Students will develop and demonstrate knowledge of theoretical materials, technical skills and project management relevant to computer information systems.

RELATED ITEM LEVEL 2

Written Comprehensive Examination

Indicator Description:

MS in CDS Comprehensive Exam

Our MS in CDS offers two options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.

All MS in CDS students in Non-Thesis Option must pass **written comprehensive exams for core subjects where they obtained a grade of B or lower**, **achieving a grade of at least 70**. As exams are conducted during their terminal semester, it is strongly encouraged to finish the core subjects before the terminal semester.

The core courses for CDS program (Non-Thesis) are:

- COSC 5318 Database Systems
- COSC 5319 Algorithm Design and Analysis
- COSC 5327 Operating Systems

- COSC 6318 Language and Compiler Design
- COSC 6319 Software Engineering

Indicators

The indicators for the MS in CDS Program's comprehensive exam are outlined as follows:

- COSC 5318 Database Systems
  - Students' understanding of core database concepts, such as relational database theory, normalization, transaction management, indexing, and query optimization, is assessed using direct measures, specifically exam scores. The comprehensive exam includes multiple-choice, short-answer, and problem-solving questions designed to evaluate both theoretical knowledge and practical application. The comprehensive exam scores are collected to assess student performance on these key topics.
- COSC 5319 Algorithm Design and Analysis
  - Students' ability to design and analyze computing algorithms, with a focus on correctness, efficiency, and feasibility, is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes problem-solving questions that require students to apply techniques such as asymptotic analysis, dynamic programming, and divide-and-conquer strategies. The comprehensive exam scores are collected to assess student performance on these key topics.
- COSC 5327 Operating Systems
  - Students' understanding of operating system concepts, including computer architecture, concurrent processes, multi-threaded systems, and memory management, is assessed through direct measures, such as exam scores and project evaluations. The comprehensive exam includes questions on topics such as scheduling, I/O management, file systems, networking, and distributed systems, requiring both theoretical knowledge and practical application. The comprehensive exam scores are collected to assess student performance on these key topics.
- COSC 6318 Language and Compiler Design
  - Students' understanding of computer programming languages, including language design principles, formal grammars, and language paradigms, is assessed through direct measures, such as exam scores and project evaluations. The comprehensive exam includes questions on topics such as procedural operating environments, language standardization, and language support for parallel and distributed programming. The comprehensive exam scores are collected to assess student performance on these key topics.
- COSC 6319 Software Engineering
  - Students' proficiency in software engineering strategies, techniques, and methodologies is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on conventional and object-oriented software engineering methodologies, software measurement, and management. The comprehensive exam scores are collected to assess student performance on these key topics.

Criterion Description:

MS in CDS's Comprehensive Exam Criteria

The criterion for each course's comprehensive exam is to achieve a passing score of at least 70%. If a student fails the exam, they are allowed one re-examination. A third attempt may be permitted only with the approval of the appropriate academic dean and the department. Students who fail all three attempts are terminated from the program. This policy ensures that students have multiple opportunities to demonstrate their understanding of the material while maintaining academic standards.

Findings Description:

MS in CDS, Comprehensive Exam Results

Fall 2023

Out of 11 students in their terminal semester, one student with the Thesis option received a waiver for the comprehensive exam, while the remaining 10 students were required to take the test for the following courses.

- COSC 5318 Database Systems
  - 5 of the 10 students did not take the exam as they received an A.
  - All 5 remaining students scored at least 80% on the test.
- COSC 5319 Algorithm Design and Analysis
  - All 10 students received an A and thus were granted a waiver.
- COSC 5327 Operating Systems
  - 5 of the 10 students did not take the exam as they received an A.
  - All 5 remaining students scored at least 80% on the test.
- COSC 6318 Language and Compiler Design
  - 5 of the 10 students did not take the exam as they received an A.
  - All 5 remaining students scored at least 80% on the test.
- COSC 6319 Software Engineering
  - All 10 students received an A and thus were granted a waiver.

Overall, all students who were required to take the comprehensive exam successfully passed, with each scoring at least 80%. This indicates that the program's preparation and support mechanisms were effective for the students who took the exam.

Spring 2024

There were 4 students required to take the test for the following courses.

- COSC 5318 Database Systems
  - One student received an A and thus was granted a waiver.
  - All 3 remaining students scored at least 80% on the test.
- COSC 5319 Algorithm Design and Analysis
  - 4 students received an A and thus was granted a waiver.
  - One remaining student scored at least 80% on the test.
- COSC 5327 Operating Systems
  - All 10 students received an A and thus were granted a waiver.
- COSC 6318 Language and Compiler Design
  - All 10 students received an A and thus were granted a waiver.
- COSC 6319 Software Engineering
  - All 10 students received an A and thus were granted a waiver.

Overall, all students who were required to take the comprehensive exam successfully passed, with each scoring at least 80%. This indicates that the program's preparation and support mechanisms were effective for the students who took the exam.

Summer 2024

We did not have students required to take the tests.

Findings

- High Passing Rates: All students required to take the comprehensive exam scored at least 80%, demonstrating strong overall performance.
- Effective Preparation: The consistent high performance on the comprehensive exams suggests that the program's preparation and support mechanisms are effective. Note that all MS in CDS scored at least 80%.
- Waivers Due to High Grades: The waiver system appears to be functioning as intended, with a significant number of students receiving waivers due to achieving an A in their core courses. This indicates that students who excel in their coursework are adequately prepared for the comprehensive exam.
- No Students Required to Take Exams in Some Terms: For Summer 2024, there were no students required to take the exams in the MS in CDS program. This may indicate that a large number of students either completed their coursework early or were not in their terminal semester during that term.

RELATED ITEM LEVEL 3

Written Comprehensive Examination
Action Description:

Action Plan for MS in CDS's comprehensive exams:

- Maintain the current support and preparation strategies that have led to high passing rates. Regularly review and update the exam preparation resources and support services based on student feedback and performance data.
- While the waiver system is successful in reducing the number of students required to take the exam, evaluate if any adjustments are needed to better align with program objectives or address any emerging trends.
- Regularly review the comprehensive exam content to ensure it aligns with the current curriculum and adequately assesses the students' knowledge and skills. Update exam content if necessary to reflect any changes in the program or industry standards.
- Ensure that students are well-informed about the comprehensive exam requirements and waiver criteria. This will help maintain high levels of performance and minimize any confusion regarding the examination process.

RELATED ITEM LEVEL 1

Apply Knowledge And Skills In Projects And Real Work Environments
Performance Objective Description:
Students will practice and demonstrate their capabilities and skills relevant to computer information systems in projects simulating real world tasks.

RELATED ITEM LEVEL 2

Final Capstone Project
KPI Description:
MS in CDS's Capstone Projects

Our MS in CDS offers two options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for

COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.

- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.

All MS in CDS students in Thesis Option are required to complete a Thesis, while students in Non-Thesis Option must complete a master's project.

- A thesis is typically a more extensive and in-depth research project. It involves conducting original research, often contributing new knowledge or insights to the field. Theses require a rigorous investigation, data collection, analysis, and interpretation of results. They are expected to be comprehensive and demonstrate a deep understanding of the chosen topic. The primary purpose of a thesis is to contribute new knowledge or advance the existing body of knowledge in the chosen field.
- On the other hand, a master's project is generally a smaller-scale endeavor compared to a thesis. It might involve applying existing knowledge to solve a practical problem or developing a prototype, application, or creative work. While it still requires research and analysis, the scope is usually narrower and more focused. Master's projects tend to emphasize practical application.

KPIs

Thesis

- Completion Rate: The percentage of students in the Thesis Option who successfully complete and defend their thesis by the end of their program.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their thesis.
- Publication and Contribution: The number of theses that result in a publication, presentation, or significant contribution to the field.
- Time to Completion: The average time taken for students in the Thesis Option to complete their thesis from the start of the project.

Master's Project

- Completion Rate: The percentage of students in the Non-Thesis Option who successfully complete and present their master's project.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their master's project.
- Timeliness: The average time taken for students in the Non-Thesis Option to complete their master's project from initiation to final submission.

Target Description:

The following targets are associated with each Key Performance Indicator (KPI) for the MS in CDS program:

Thesis

- Completion Rate: Aim for 90% or higher of students in the Thesis Option to successfully complete and defend their thesis by the end of their program.
- Grade Achievement: Target 80% or higher of theses to receive an "A" grade or its equivalent.
- Publication and Contribution: Aim for 25% of theses to result in a publication, presentation, or significant contribution to the field.
- Time to Completion: Average time for thesis completion should be within 2 semesters from the start of the thesis project.

Master's Project

- Completion Rate: Aim for 90% or higher of students in the Non-Thesis Option to successfully complete and present their master's project.
- Grade Achievement: Target 80% or higher of master's projects to receive an "A" grade or its equivalent.
- Timeliness: Average time for project completion should be within two semesters from the start of the project.

Results Description:

Results

Fall 2023

- Thesis Option: One student successfully completed their thesis within two semesters, received an "A" grade, and published the results.
- Non-Thesis Option: Out of 10 students, all received "A" grades and completed their projects within two semesters.

Spring 2024

- Non-Thesis Option: Three students completed their projects within two semesters, all receiving "A" grades.

Summer 2024

No students completed a thesis or master's project during Summer 2024.

Findings

Thesis Completion

The student in the Thesis Option demonstrated high performance by completing the thesis within the expected timeframe, achieving an "A" grade, and publishing the results. This indicates a successful and impactful research outcome.

Master’s Project Completion

All Non-Thesis students in both Fall 2023 and Spring 2024 completed their projects within the expected timeframe and received "A" grades. This suggests that students in the Non-Thesis Option are effectively meeting the program’s project requirements.

Program Effectiveness

The consistent achievement of high grades and timely project completion across both options highlights the effectiveness of the program's support mechanisms and instructional quality.

Summer Term

No thesis or master's projects were completed in the Summer 2024 term, which may be due to the typical academic schedule or student availability. This may be an area to monitor for future trends or consider adjustments if necessary.

RELATED ITEM LEVEL 3

Final Capstone Project

Action Description:

Action Plans for MS in CDS's Casptone Projects

1. Continue to ensure that project proposals are reviewed within the first two weeks of the semester. Consider streamlining the review process if needed, and provide timely feedback to students to help them refine their proposals.
2. Maintain the structure of weekly progress meetings with project advisors. Ensure that these meetings are productive by providing guidelines for effective progress reporting and addressing any issues that arise.
3. Review the midterm evaluation process to ensure it effectively assesses students' progress. Collect feedback from both students and faculty to identify any areas for improvement in the evaluation process.
4. Ensure that the distribution of project activities among committee members is balanced and that all committee members are engaged in the evaluation process. Consider providing additional training or guidelines for committee members to enhance their effectiveness.
5. Evaluate the effectiveness of the final project presentations and provide constructive feedback to students. Consider implementing a formal feedback mechanism for both the presentation and the completed application to help students improve their work.
6. Periodically review the established procedures for managing projects to ensure they align with current best practices and address any emerging needs or challenges. Update procedures as necessary to improve the overall project management process.
7. Promote the identification of significant application development needs by encouraging students to engage with real-world clients or scenarios. Provide additional resources or support to help students address complex, real-world problems in their projects.

RELATED ITEM LEVEL 2

Written Comprehensive Examination

KPI Description:

CDS Comprehensive Exam

Our MS in CDS offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.

All MS in CDS students in Non-Thesis Option must pass **written comprehensive exams for core subjects where they obtained a grade of B or lower**, **achieving a grade of at least 70**. As exams are conducted during their terminal semester, it is strongly encouraged to finish the core subjects before the terminal semester.

The core courses for CDS program (Non-Thesis) are:

- COSC 5318 Database Systems
- COSC 5319 Algorithm Design and Analysis
- COSC 5327 Operating Systems
- COSC 6318 Language and Compiler Design
- COSC 6319 Software Engineering

KPI (Key Performance Indicators)

- Pass Rate: The percentage of students who achieve a passing score of at least 70% on their first attempt. This metric indicates how well students are performing on their initial exam.
- Success Rate of Re-Examinations: The percentage of students who pass the comprehensive exam on their re-examination attempt. This shows how effective the re-taking policy is in helping students meet the required standards.
- Percentage of Students Passing All Attempts: The percentage of students who successfully pass the comprehensive exam within the allowed number of attempts (including re-examinations). This reflects the overall effectiveness of the exam preparation and support provided.
- Average Exam Score: The average score of all students who take the comprehensive exam, which helps gauge the overall performance and understanding of the course material.
- Exam Failure Rate: The percentage of students who fail the exam on all attempts, which provides insight into the proportion of students struggling with the exam despite multiple attempts.

Target Description:

The target is for at least 85% of students to achieve a passing score of at least 70% on their first attempt at the comprehensive exam. Among those who do not pass on the first attempt, the goal is for at least 75% to pass on their re-examination. The program also aims for an average exam score of 75% or higher across all students taking the exam. The program also seeks to minimize the number of students who fail all three attempts, with fewer than 5% of students reaching this point, indicating effective preparation and support throughout the exam process.

Results Description:

MS in CDS, Comprehensive Exam Results

Fall 2023

Out of 11 students in their terminal semester, one student with the Thesis option received a waiver for the comprehensive exam, while the remaining 10 students were required to take the test for the following courses.

- COSC 5318 Database Systems
  - 5 of the 10 students did not take the exam as they received an A.
  - All 5 remaining students scored at least 80% on the test.
- COSC 5319 Algorithm Design and Analysis
  - All 10 students received an A and thus were granted a waiver.
- COSC 5327 Operating Systems
  - 5 of the 10 students did not take the exam as they received an A.

    - All 5 remaining students scored at least 80% on the test.
- COSC 6318 Language and Compiler Design
    - 5 of the 10 students did not take the exam as they received an A.
    - All 5 remaining students scored at least 80% on the test.
- COSC 6319 Software Engineering
    - All 10 students received an A and thus were granted a waiver.

Overall, all students who were required to take the comprehensive exam successfully passed, with each scoring at least 80%. This indicates that the program's preparation and support mechanisms were effective for the students who took the exam.

Spring 2024

There were 4 students required to take the test for the following courses.

- COSC 5318 Database Systems
    - One student received an A and thus was granted a waiver.
    - All 3 remaining students scored at least 80% on the test.
- COSC 5319 Algorithm Design and Analysis
    - 4 students received an A and thus was granted a waiver.
    - One remaining student scored at least 80% on the test.
- COSC 5327 Operating Systems
    - All 10 students received an A and thus were granted a waiver.
- COSC 6318 Language and Compiler Design
    - All 10 students received an A and thus were granted a waiver.
- COSC 6319 Software Engineering
    - All 10 students received an A and thus were granted a waiver.

Overall, all students who were required to take the comprehensive exam successfully passed, with each scoring at least 80%. This indicates that the program's preparation and support mechanisms were effective for the students who took the exam.

Summer 2024

We did not have students required to take the tests.

RELATED ITEM LEVEL 3

Written Comprehensive Examination

Action Description:

Action Plan for MS in CDS's comprehensive exams:

- Maintain the current support and preparation strategies that have led to high passing rates. Regularly review and update the exam preparation resources and support services based on student feedback and performance data.
- While the waiver system is successful in reducing the number of students required to take the exam, evaluate if any adjustments are needed to better align with program objectives or address any emerging trends.
- Regularly review the comprehensive exam content to ensure it aligns with the current curriculum and adequately assesses the students' knowledge and skills. Update exam content if necessary to reflect any changes in the program or industry standards.
- Ensure that students are well-informed about the comprehensive exam requirements and waiver criteria. This will help maintain high levels of

performance and minimize any confusion regarding the examination process.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

Succesfully launch MS in CDS with a Professional Plan (course-based MS Degree).

Succesffuly launch Online Data Science Certificate program was proposed.

Update of Progress to the Previous Cycle's PCI:

Update:

- MS in CDS Professional Plan: We are currently evaluating the potential implementation of a Professional Plan for the MS in CDS program. This consideration comes in response to the increasing number of students in the DF/IAC program opting for the professional track, which does not require research projects. We aim to ensure that at least one of our MS programs emphasizes research activities, providing students with opportunities for significant research engagement. The decision on whether to proceed with the Professional Plan for the MS in CDS will be based on strategic discussions and an assessment of how it aligns with our goals for research-focused education.
- Online Data Science Certificate Program: We successfully launched the Online Data Science Certificate program. This new program has been well-received and provides students with flexible, high-quality education in data science. The program is designed to enhance the skills of professionals and students in the rapidly growing field of data science, aligning with our commitment to offering innovative and relevant educational opportunities.

Moving forward, we will continue to focus on enhancing the research components of our programs and evaluating new opportunities to expand our offerings based on student and industry needs.

New Plan for Continuous Improvement Item

Closing Summary:

Continue offering recruitment scholarships to attract new students. Expand the scholarship program if possible and ensure that the promotion of these scholarships is well-publicized during orientations and through other channels.

Ensure that financial aid coverage for STEM/Preparatory courses is maintained. Regularly review and adjust financial aid policies to support students effectively and retain them in the program.

Discuss implementing additional support mechanisms for students working on their theses and projects.

Continue to monitor the impact of the Professional and Thesis Options and make necessary adjustments based on student enrollment trends and feedback.

Computing Science BS

Ethical Principles, Technical Skills, And Management Skills (core)

Goal Description:

To develop students' knowledge of ethical principles, technical skills, and management skills relevant to the field of computer science.

Providing Department: Computing Science BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Acquisition Of Technical Skill, Management And Ethical Principles

Learning Objective Description:

Students will develop and demonstrate knowledge of ethical principles, technical skills, and management skills relevant to the field of computer science.

RELATED ITEM LEVEL 2

Finding: ABET Assessment data

Indicator Description:

To assess the B.SC program in computer science, ABET results were collected during fall and spring semesters. We have implemented a course-based evaluation.

The following provide a list of courses used during the assessment cycle:

- COSC 3318 Data Base Management System
- COSC 3319 Data Structure and Algorithm
- COSC 4318 Advanced Language Concepts
- COSC 4319 Software Engineering
- COSC 4349 Professionalism and Ethics

Standardized departmental syllabuses were developed for each of the above classes. Course contents were mapped directly to ABET students learning outcomes and used as indicators to measure students performance on these classes and ultimately measure the program overall performance. During the assessment period, students grades were collected from these five courses and processed to estimate the program overall performance. In our course-based evaluation, we considered a score of 70% on selected ABET student learning outcomes per course as passing criteria. The following provide a list of ABET students learning outcomes that are used to assess this program.

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

In addition to course-based evaluation, we have deployed the following measurement tools.

- Exit survey.
- Ethic Quiz

Criterion Description:

The expected score used for course-based evaluation is 70% for measuring success. Average scores for each ABET students learning outcomes were computed based on (COSC 3318, COSC 3319, COSC 4319, and COSC 4349). Computed average scores were used to measure the overall program's performance.

See attached figure for ABET course summary evaluation.

Attached Files

SE Evaluation (Fall 2023)(1).png
Project Presentation (Fall 2023)(1).png
Project Evaluation (Fall 2023)(1).png
Course Evaluation (Fall 2023)(1).png
COSC 4319 (Fall 2023)(1).png
COSC 3318 (Fall 2023)(1).png
COSC 3319 (Fall 2023)(1).png
COSC 4319(12).xlsx
COSC 3318(8).xlsx
Peer Evaluation(7).xlsx
COSC 4349(10).xlsx
Project Evaluation(10).xlsx
Project Presentation(8).xlsx
ABET Summary Evaluation (Fall 2023)(1).png
evaluate4ABET_spring2023(2).m
COSC 4349 (Fall 2023)(1).png
COSC 3319(8).xlsx
COSC 4349 (SPRING 2023)(1).png
COSC 4319(9).xlsx
COSC 4319 (SPRING 2023)(1).png
COSC 4349(8).xlsx
Project Presentation(7).xlsx
Project Evaluation(9).xlsx
COSC 3318(6).xlsx
Peer Evaluation(6).xlsx
ABET Summary Evaluation (SPRING 2023)(1).png
COSC 3318 (SPRING 2023)(1).png
Course Evaluation (SPRING 2023)(1).png
Ethics Evaluation(4).xlsx
COSC 3319(6).xlsx
SE Evaluation (SPRING 2023)(1).png
COSC 3319 (SPRING 2023)(1).png
evaluate4ABET_spring2023.m
Project Evaluation (SPRING 2023)(1).png
Exit_survey_Answer_sheet_Spr_23(1).xlsx
Peer Evaluation (SPRING 2023)(1).png
Project Presentation (SPRING 2023)(1).png

Findings Description:

ABET data were collected during spring and fall semester of the academic year 2023-2024. Results were collected and shared with the department during UCC meeting. The collected data showed that above 70% of the students were able to pass selected courses

RELATED ITEM LEVEL 3

New Action Item

Action Description:

- ABET data is to be collected and results will be discussed during the department UCC meetings.

- Two UCC meetings will be held during the year to discuss courses contents or the addition of new courses to improve the CS program.
- Analyze ABET collected scores every semester to identify areas that needs improvement.

Specialized Competencies

Goal Description:

To develop students' skills and knowledge in their concentration areas. The department offers three concentration areas: Computer Science, Information Systems, and Information Assurance.

Providing Department: Computing Science BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Specialized Skills

Learning Objective Description:

Students will develop and demonstrate skills and knowledge in their concentration areas. The department offers three concentration areas: Computer Science, Information Systems, and Information Assurance and Security.

Indicator: ABET data collected from five classes samples, COSC 3318, COSC 3319, COSC 4349, COSC 3319, and COSC 4318. These courses will be use to assess students' performance in developing various skills such as software design, advanced programming, ethical computing, data base programming, and team work and communication skills. During each semester, data will be collected from these five different classes, results are shared and analyzed with department during UCC meeting. Various computing metrics are extracted from the collected data, class averages, senior project development and presentation, and various terms projects and homework assignments.

RELATED ITEM LEVEL 2

Finding: ABET Assessment data

Indicator Description:

To assess the B.SC program in computer science, ABET results were collected during fall and spring semesters. We have implemented a course-based evaluation.

The following provide a list of courses used during the assessment cycle:

- COSC 3318 Data Base Management System
- COSC 3319 Data Structure and Algorithm
- COSC 4318 Advanced Language Concepts
- COSC 4319 Software Engineering
- COSC 4349 Professionalism and Ethics

Standardized departmental syllabuses were developed for each of the above classes. Course contents were mapped directly to ABET students learning outcomes and used as indicators to measure students performance on these classes and ultimately measure the program overall performance. During the assessment period, students grades were collected from these five courses and processed to estimate the program overall performance. In our course-based evaluation, we considered a score of 70% on selected ABET student learning outcomes per course as passing criteria. The following provide a list of ABET students learning outcomes that are used to assess this program.

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

In addition to course-based evaluation, we have deployed the following measurement tools.

- Exit survey.
- Ethic Quiz

Criterion Description:

The expected score used for course-based evaluation is 70% for measuring success. Average scores for each ABET students learning outcomes were computed based on (COSC 3318, COSC 3319, COSC 4319, and COSC 4349). Computed average scores were used to measure the overall program's performance.

See attached figure for ABET course summary evaluation.

Attached Files

SE Evaluation (Fall 2023)(1).png
Project Presentation (Fall 2023)(1).png
Project Evaluation (Fall 2023)(1).png
Course Evaluation (Fall 2023)(1).png
COSC 4319 (Fall 2023)(1).png
COSC 3318 (Fall 2023)(1).png
COSC 3319 (Fall 2023)(1).png
COSC 4319(12).xlsx
COSC 3318(8).xlsx
Peer Evaluation(7).xlsx
COSC 4349(10).xlsx
Project Evaluation(10).xlsx
Project Presentation(8).xlsx
ABET Summary Evaluation (Fall 2023)(1).png
evaluate4ABET_spring2023(2).m
COSC 4349 (Fall 2023)(1).png
COSC 3319(8).xlsx
COSC 4349 (SPRING 2023)(1).png
COSC 4319(9).xlsx
COSC 4319 (SPRING 2023)(1).png
COSC 4349(8).xlsx
Project Presentation(7).xlsx
Project Evaluation(9).xlsx
COSC 3318(6).xlsx
Peer Evaluation(6).xlsx
ABET Summary Evaluation (SPRING 2023)(1).png
COSC 3318 (SPRING 2023)(1).png
Course Evaluation (SPRING 2023)(1).png
Ethics Evaluation(4).xlsx
COSC 3319(6).xlsx
SE Evaluation (SPRING 2023)(1).png
COSC 3319 (SPRING 2023)(1).png
evaluate4ABET_spring2023.m
Project Evaluation (SPRING 2023)(1).png
Exit_survey_Answer_sheet_Spr_23(1).xlsx

Peer Evaluation (SPRING 2023)(1).png
Project Presentation (SPRING 2023)(1).png

Findings Description:

ABET data were collected during spring and fall semester of the academic year 2023-2024. Results were collected and shared with the department during UCC meeting. The collected data showed that above 70% of the students were able to pass selected courses

RELATED ITEM LEVEL 3

New Action Item

Action Description:

- ABET data is to be collected and results will be discussed during the department UCC meetings.
- Two UCC meetings will be held during the year to discuss courses contents or the addition of new courses to improve the CS program.
- Analyze ABET collected scores every semester to identify areas that needs improvement.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The following items were discussed during UCC meetings.

1. Possible revision of COSC 1436 and COSC 1437 courses' contents to strengthen students' knowledge in keys areas that might be relevant concepts covered in COSC 3319 course (Data Structure). The following is a list of topics that Dr. Burris has suggested for inclusion in COSC 1436 and COSC 1437:

- Multi-threading
- Synchronized methods
- OOD, OOP and templates/generics
- Inheritance and polymorphism

- Curriculum development and improvement
  - Redesign COSC 2329 course: The contents of the course will be fully revised during Fall 2023. The revisions include adapting a new textbook, replacing MIP architecture with ARM architecture, and utilizing a new ARM assembler simulating toolset for coding.

- We are proposing to update the course's requirements/prerequisites for COSC 4349. Based on the current course requirements, only senior level students are able to register for the course. The main objective of relaxing COSC 4349 course's requirements is to allow junior level students to get into the course.

- We are proposing the replacement of COSC 4340 special topic course by a new course. The new course will be related to hardware design and implementation. it will be offered during each Fall semester.

Update of Progress to the Previous Cycle's PCI:

- A group a discussion has been held during the spring 2024 semester to discuss contents revisions for COSC 1436 and COSC 1437. During the meeting, the faculties members agreed to modify the contents

courses to include concepts that cover the following topics:
    - Multi-threading
    - Synchronized methods
    - OOD, OOP
    - Inheritance and Polymorphism
- The content of COSC2329 has been fully revised during Fall 2023 and Spring 2023. The course now cover topics related ARM processor. A new textbook that cover the ARM architecture has been added to syllabus and its used to teach this course.
- Course requirements for COSC4349 has been updated during Spring 2024, some course's previous requirement has been lifted. Students with junior standing are now allow to register for the course.
- During the spring 2024 semester, FormB has been submitted to the college curriculum committee for replacement of COSC4340 (Special topic) with a new course in embedded system. FormB has passed the college curriculum and we are in the process of offering this course in the following Fall semester (Fall 2025.

New Plan for Continuous Improvement Item

Closing Summary:

The BSc in computer science is an ABET-accredited program. During the past five years we have measured student retention of fundamental concepts in computing, especially the knowledge they acquired from five core classes in CS. Every fall and spring semester, a list of five core classes in the CS program is used for our yearly assessment. These classes are COSC 3318 Database management systems, COSC 3319 Data structures and algorithm, COSC 4319 Software engineering, COSC4349 professionalism and ethics, and COSC 4318 advanced language concepts. Each of these classes' learning outcomes were directly mapped to ABET learning outcomes. The following provides a list of ABET students learning outcomes that we measure via the application of various assessment tools:

LO1: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.

LO2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

LO3: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

LO4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

LO5: Communicate effectively in a variety of professional contexts

LO6: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Each of the listed ABET learning outcomes was measured using class-specific assessment methods. For example, the COSC 4319 software engineering has specified six Course Learning Outcomes (CLO). The following table describes the CLO to ABET learning outcomes mapping

Course learning outcomes for COSC 4319

CLO1: Be able to identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance, and quality requirements.

CLO2: Be able to elicit, analyze, and specify software requirements through a productive working relationship with various stakeholders of a software development project.

CLO3: Work and collaborate effectively in teams possibly with multidisciplinary backgrounds as a leader or a member

CLO4: Participate in design, development, deployment, and maintenance of a large-scale software development project including various testing and security issues

CLO5: Communicate effectively through effective written reports/documents, effective presentations, and other means of verbal/written communications

CLO6: Be able to evaluate the impact of potential solutions to software engineering problems in a global society, using the knowledge of contemporary issues and emerging software engineering trends, models, tools, security, and techniques

Table1: CLO software engineering to ABET learning outcomes mapping

CLO software Engineering	ABET Learning Outcomes
CLO1, CLO2, CLO4, CLO6	LO1
CLO3, CLO5	LO5
CLO3	LO3
CLO1, CLO2, CLO4, CLO6	LO6

Assessment tools based on class project presentation and demonstration, exams, assignments, quizzes, and labs were deployed to assess students' success rates on ABET predefined learning outcomes. Similar assessment tools were employed by COSC 3318, COSC 3319, COSC 4349, COSC 4318 to measure students' retention on foundational concepts and skills they acquired during their study.

Two UCC meetings were held during the fall and spring semesters of each year to discuss ABET assessment data. Data collected for the past five years shows that student's retention of knowledge in COSC 3318, COSC 4318, COSC 4319, and COSC 4349 were acceptable. Meanwhile, data collected from COCS 3319 shows that the majority of students were unable to complete the course with a high success rate. The also data showed that students struggled to complete major coding problems. It shows that students are missing key concepts in fundamental programming that are required for the COC 3319 course. The following measures were considered to help improve students' performance in COCS 3319.

1. Key programming concepts that improve student success rate in COSC 3319 will be incorporated into COSC 1436 and COCS 1437 courses. The two courses serve as introductory programming courses that are required for COCS 3319.

2. Students in COSC 3319 are now capable of using their preferred programming language for coding. This gave the students the ability to focus more on the algorithmic side of the course than learning a new programming language.

3. UCC and the instructor of COSC 3319 will continue to measure students' success rate in the course via observing and analyzing data collected from ABET assessment process.

Digital Forensics MS

Technical Competence - To Develop And Demonstrate Knowledge Of Theoretical Materials, And Computational And Technical Skills

Goal Description:

Graduates with a master degree in digital forensics will have a strong technical foundation, that is, to develop and demonstrate knowledge of theoretical materials, and computational and technical skills in the areas of digital forensics.

Providing Department: Digital Forensics MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Understand The Body Of Knowledge Of Digital Forensics

Learning Objective Description:

Students will develop and demonstrate knowledge of theoretical materials, technical skills and project management relevant to digital forensics.

RELATED ITEM LEVEL 2

Written Comprehensive Examination

Indicator Description:

MS in DF's Comprehensive Exam

Our MS in DF offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in DFstudents in Non-Thesis and Professional Options must pass **written comprehensive exams for core subjects where they obtained a grade of B or lower**, **achieving a grade of at least 70**. As exams are conducted during their terminal semester, it is strongly encouraged to finish the core subjects before the terminal semester.

- The core courses for DF program (Non-Thesis) are:
  - DFSC 5315 Network and Cyber Security
  - DFSC 5316 File System Forensics
  - DFSC 5317 Digital Security
  - DFSC 5318 Cyber Law

    - DFSC 5327 Digital Forensics Investigation
- The core courses for DF program (Professional) are:
    - DFSC 5315 Network and Cyber Security
    - DFSC 5316 File System Forensics
    - DFSC 5317 Digital Security
    - DFSC 5318 Cyber Law
    - DFSC 5327 Digital Forensics Investigation
    - DFSC 5338 Ethical Hacking
    - DFSC 6312 Multimedia Forensics

Indicators

The indicators for the MS in DF Program's comprehensive exam are outlined as follows:

- DFSC 5315 Network and Cyber Security
    - Students' understanding of network and cyber security principles is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on methodologies for designing security systems, establishing security protocols, and identifying best practices in administration, testing, and response protocols for secure communications. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5316 File System Forensics
    - Students' understanding of file system forensics concepts is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on the structures, encoding, boot process, and storage technologies of modern computers, focusing on their implications for analyzing volumes and file systems for forensic purposes. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5317 Digital Security
    - Students' understanding of digital security concepts is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on individual vs. government privacy issues, federal encryption standards, cryptography, and the various layers of security. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5318 Cyber Law
    - Students' understanding of the impact of law on digital security is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on criminal intent, the concept of the digital victim, jurisdictional issues, and legal terms relevant to security management. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5327 Digital Forensics Investigation
    - Students' proficiency in digital forensics investigation is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on tools for information recovery, cryptographic analysis, password recovery, and methods for bypassing specific target operating systems. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5338 Ethical Hacking
    - Students' understanding of penetration testing and vulnerability analysis is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on methodologies, techniques, and tools used to identify and exploit

vulnerabilities in information technology systems. The comprehensive exam scores are collected to assess student performance on these key topic.

- DFSC 6312 Multimedia Forensics
    - Students' understanding of multimedia security and forensics is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on image processing, JPEG compression, audio compression (such as MP3 and Advanced Audio Coding), and multimedia source identification. The comprehensive exam scores are collected to assess student performance on these key topic.

KPI (Key Performance Indicators)

- Pass Rate: The percentage of students who achieve a passing score of at least 70% on their first attempt. This metric indicates how well students are performing on their initial exam.
- Success Rate of Re-Examinations: The percentage of students who pass the comprehensive exam on their re-examination attempt. This shows how effective the re-taking policy is in helping students meet the required standards.
- Percentage of Students Passing All Attempts: The percentage of students who successfully pass the comprehensive exam within the allowed number of attempts (including re-examinations). This reflects the overall effectiveness of the exam preparation and support provided.
- Average Exam Score: The average score of all students who take the comprehensive exam, which helps gauge the overall performance and understanding of the course material.
- Exam Failure Rate: The percentage of students who fail the exam on all attempts, which provides insight into the proportion of students struggling with the exam despite multiple attempts.

Attached Files

Copy of Comp-Exams

Criterion Description:

MS in DF's Comprehensive Exam Criteria

The criterion for each course's comprehensive exam is to achieve a passing score of at least 70%. If a student fails the exam, they are allowed one re-examination. A third attempt may be permitted only with the approval of the appropriate academic dean and the department. Students who fail all three attempts are terminated from the program. This policy ensures that students have multiple opportunities to demonstrate their understanding of the material while maintaining academic standards.

Findings Description:

MS in DF, Comprehensive Exam Results

Fall 2023

We had only one student in their terminal semester who received an A for all core courses, and thus was granted a waiver.

Spring 2024

We had three students in their terminal semester who received an A for all core courses, and thus were granted a waiver.

Summer 2024

We did not have students required to take the tests.

Findings

Throughout the academic year, all students who were required to take the comprehensive exam were exempted due to achieving an A in all core courses. This consistent pattern of receiving waivers suggests that the academic standards for waiver eligibility are effectively met by students in the MS in DF program. The absence of any students taking the exam in the Summer 2024 term further supports the conclusion that students are meeting the program's academic requirements consistently.

RELATED ITEM LEVEL 3

Written Comprehensive Examination
Action Description:

Action Plan for MS in DF's comprehensive exams:

- Maintain the current support and preparation strategies that have led to high passing rates. Regularly review and update the exam preparation resources and support services based on student feedback and performance data.
- While the waiver system is successful in reducing the number of students required to take the exam, evaluate if any adjustments are needed to better align with program objectives or address any emerging trends.
- Regularly review the comprehensive exam content to ensure it aligns with the current curriculum and adequately assesses the students' knowledge and skills. Update exam content if necessary to reflect any changes in the program or industry standards.
- Ensure that students are well-informed about the comprehensive exam requirements and waiver criteria. This will help maintain high levels of performance and minimize any confusion regarding the examination process.

RELATED ITEM LEVEL 1

Apply Knowledge And Skills In Projects And Real Work Environments
Performance Objective Description:
Students will practice and demonstrate their capabilities and skills relevant to digital forensics and investigation in projects simulating real world tasks.

RELATED ITEM LEVEL 2

Final Capstone Project
KPI Description:
MS in DF's Capstone Projects

Our MS in DF offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note

that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in DF students in Thesis Option are required to complete a Thesis, while students in Non-Thesis Option must complete a master's project.

- A thesis is typically a more extensive and in-depth research project. It involves conducting original research, often contributing new knowledge or insights to the field. Theses require a rigorous investigation, data collection, analysis, and interpretation of results. They are expected to be comprehensive and demonstrate a deep understanding of the chosen topic. The primary purpose of a thesis is to contribute new knowledge or advance the existing body of knowledge in the chosen field.
- On the other hand, a master's project is generally a smaller-scale endeavor compared to a thesis. It might involve applying existing knowledge to solve a practical problem or developing a prototype, application, or creative work. While it still requires research and analysis, the scope is usually narrower and more focused. Master's projects tend to emphasize practical application.

KPIs

Thesis

- Completion Rate: The percentage of students in the Thesis Option who successfully complete and defend their thesis by the end of their program.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their thesis.
- Publication and Contribution: The number of theses that result in a publication, presentation, or significant contribution to the field.
- Time to Completion: The average time taken for students in the Thesis Option to complete their thesis from the start of the project.

Master's Project

- Completion Rate: The percentage of students in the Non-Thesis Option who successfully complete and present their master's project.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their master's project.
- Timeliness: The average time taken for students in the Non-Thesis Option to complete their master's project from initiation to final submission.

Target Description:

The following targets are associated with each Key Performance Indicator (KPI) for the MS in DF program:

Thesis

- Completion Rate: Aim for 90% or higher of students in the Thesis Option to successfully complete and defend their thesis by the end of their program.
- Grade Achievement: Target 80% or higher of theses to receive an "A" grade or its equivalent.
- Publication and Contribution: Aim for 25% of theses to result in a publication, presentation, or significant contribution to the field.

- Time to Completion: Average time for thesis completion should be within 2 semesters from the start of the thesis project.

Master's Project

- Completion Rate: Aim for 90% or higher of students in the Non-Thesis Option to successfully complete and present their master's project.
- Grade Achievement: Target 80% or higher of master's projects to receive an "A" grade or its equivalent.
- Timeliness: Average time for project completion should be within two semesters from the start of the project.

Results Description:

Results

Fall 2023

- Non-Thesis Option: One student successfully completed their project within two semesters, receiving an "B" grade.

Spring 2024

- Non-Thesis Option: Three students completed their projects within two semesters, all receiving "A" grades.

Summer 2024

No students completed a thesis or master's project during Summer 2024.

Findings

Thesis Completion

Since the Thesis Option was recently launched, no students were able to complete their theses during the 2023-2024 academic year. This result highlights the need for further evaluation of the support structures and timelines provided to students opting for the thesis track.

Master’s Project Completion

In Fall 2023, one student in the Non-Thesis Option completed their project within two semesters and received a "B" grade. This result highlights that while the student met the timeline requirements, there is room for improvement in the quality of the master's projects. Conversely, in Spring 2024, three students in the Non-Thesis Option completed their projects within the stipulated two semesters, all receiving "A" grades. This demonstrates that the program is effective in supporting students who receive high-quality outcomes and adhere to academic standards.

Program Effectiveness

The program’s effectiveness is reflected in the Spring 2024 results, where students in the Non-Thesis Option received "A" grades for their projects, indicating high-quality outcomes and successful adherence to the program’s expectations. However, the variation in grades during Fall 2023 suggests that there may be areas for improvement in student support and project guidance to ensure a more consistent quality of work across different terms.

Summer Term

No students completed a thesis or master’s project during Summer 2024. This absence of project completions in the summer term may point to a lower number of active students during this period. This finding suggests a need to assess and potentially address the engagement and availability of students during the summer term to ensure continuous progress in thesis and project completions throughout the academic year.

RELATED ITEM LEVEL 3

Final Capstone Project
Action Description:
Action Plans for MS in DF's Casptone Projects

1. Continue to ensure that project proposals are reviewed within the first two weeks of the semester. Consider streamlining the review process if needed, and provide timely feedback to students to help them refine their proposals.
2. Maintain the structure of weekly progress meetings with project advisors. Ensure that these meetings are productive by providing guidelines for effective progress reporting and addressing any issues that arise.
3. Review the midterm evaluation process to ensure it effectively assesses students' progress. Collect feedback from both students and faculty to identify any areas for improvement in the evaluation process.
4. Ensure that the distribution of project activities among committee members is balanced and that all committee members are engaged in the evaluation process. Consider providing additional training or guidelines for committee members to enhance their effectiveness.
5. Evaluate the effectiveness of the final project presentations and provide constructive feedback to students. Consider implementing a formal feedback mechanism for both the presentation and the completed application to help students improve their work.
6. Periodically review the established procedures for managing projects to ensure they align with current best practices and address any emerging needs or challenges. Update procedures as necessary to improve the overall project management process.
7. Promote the identification of significant application development needs by encouraging students to engage with real-world clients or scenarios. Provide additional resources or support to help students address complex, real-world problems in their projects.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):
Closing Summary
The GCC will conduct multiple meetings during the Fall 2023 and Spring 2024 semesters to discuss how to improve the below weaknesses identifed during the DF program review:

1. Low student enrollment
2. Low student degree conferred
3. No Thesis option

Update of Progress to the Previous Cycle's PCI:
The registration status for the previous academic year (MS in DF), based on data from the SHSU Enrollment Fact page, is as follows:

- 2022-2023
  - Fall 2022: 17
  - Spring 2023: 24

    - Summer 2023: 16
- 2023-2024
    - Fall 2023: 24
    - Spring 2024: 28

Actions taken during 2023-2024

- Recruitment Scholarships: To address low student enrollment, we have introduced recruitment scholarships with support from the Dean's office. This initiative offers $1,000 to students who register early, with the first 30 students receiving this benefit. As of May 12, 24 students have registered and been notified of the awards, including 12 from the Computer Science program.
- Advertising to New Students: To enhance student recruitment, we conducted new student orientations at least once a month. These orientations help lift advising holds promptly and highlight the scholarship program, encouraging early registration and securing benefits.
- Remedy for STEM/Preparatory Students: We identified that several STEM/Preparatory students were on the verge of leaving the program due to financial aid issues with their courses. We addressed this by working with the Registrar's office, Financial Aid office, and other departments to ensure these courses are now covered by financial aid, resulting in improved retention.
- Program Options: The addition of *Professional* and *Thesis* options for the DF program has been approved and has been available starting Fall 2024. This addition has aimed to provide more flexibility and enhance the program's appeal.

New Plan for Continuous Improvement Item

Closing Summary:

Continue offering recruitment scholarships to attract new students. Expand the scholarship program if possible and ensure that the promotion of these scholarships is well-publicized during orientations and through other channels.

Ensure that financial aid coverage for STEM/Preparatory courses is maintained. Regularly review and adjust financial aid policies to support students effectively and retain them in the program.

Discuss implementing additional support mechanisms for students working on their theses and projects.

Continue to monitor the impact of the Professional and Thesis Options and make necessary adjustments based on student enrollment trends and feedback.

Information Assurance and Cybersecurity MS

Technical Competence - To Develop And Demonstrate Knowledge Of Theoretical Materials, And Computational And Technical Skills

Goal Description:

Graduates with a master degree in information assurance and security will have a strong technical foundation, that is, to develop and demonstrate knowledge of theoretical materials, and computational and technical skills in the areas of information assurance and information security.

Providing Department: Information Assurance and Cybersecurity MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Understand The Body Of Knowledge Of Information Assurance And Security

Learning Objective Description:

Students will develop and demonstrate knowledge of theoretical materials, technical skills and project management relevant to information assurance and information security.

RELATED ITEM LEVEL 2

Written Comprehensive Examination

Indicator Description:

MS in IAC's Comprehensive Exam

Our MS in IAC offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in IAC students in Non-Thesis and Professional Options must pass **written comprehensive exams for core subjects where they obtained a grade of B or lower**, **achieving a grade of at least 70**. As exams are conducted during their terminal semester, it is strongly encouraged to finish the core subjects before the terminal semester.

- The core courses for IAC program (Non-Thesis) are:
  - COSC 5325 Operating System Security
  - COSC 5335 Database Security
  - DFSC 5310 Principle and Policy in Information Assurance
  - DFSC 5315 Network and Cyber Security

    - DFSC 5336 Business Continuity Management
- The core courses for IAC program (Professional) are:
    - COSC 5325 Operating System Security
    - COSC 5335 Database Security
    - DFSC 5310 Principle and Policy in Information Assurance
    - DFSC 5315 Network and Cyber Security
    - DFSC 5336 Business Continuity Management
    - DFSC 5338 Ethical Hacking
    - COSC 5330 Malware

Indicators

The indicators for the MS in IAC Program's comprehensive exam are outlined as follows:

- COSC 5325 Operating System Security
    - Students' understanding of security concepts and techniques for operating systems is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on the rationale for security, methodologies for designing operating system security, and forensic techniques applicable to various operating systems. The comprehensive exam scores are collected to assess student performance on these key topic.
- COSC 5335 Database Security
    - Students' understanding of database security concepts and techniques is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on topics such as database authentication, account security, encryption of data in transit and at rest, database auditing, and virtual private databases. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5310 Principle and Policy in Information Assurance
    - Students' understanding of security planning, policy formation, and risk management is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on security education, training and awareness programs, and physical and electronic approaches to data protection. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5315 Network and Cyber Security
    - Students' understanding of network and cyber security principles is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on methodologies for designing security systems, establishing security protocols, and identifying best practices in administration, testing, and response protocols for secure communications. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5336 Business Continuity Management
    - Students' understanding of threat identification, risk assessment, vulnerability analysis, and business continuity for enterprise IT systems is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on physical safeguards, policies for data protection at fixed sites, and techniques for maintaining enterprise data during critical circumstances. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5338 Ethical Hacking
    - Students' understanding of penetration testing and vulnerability analysis is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam

includes questions on methodologies, techniques, and tools used to identify and exploit vulnerabilities in information technology systems. The comprehensive exam scores are collected to assess student performance on these key topics.

- COSC 5330 Malware
    - Students' understanding of malicious software identification and deconstruction is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on static and dynamic analyses of malware, malware deconstruction techniques, and rootkit elimination. The comprehensive exam scores are collected to assess student performance on these key topics.

Criterion Description:

MS in IAC's Comprehensive Exam Criteria

The criterion for each course's comprehensive exam is to achieve a passing score of at least 70%. If a student fails the exam, they are allowed one re-examination. A third attempt may be permitted only with the approval of the appropriate academic dean and the department. Students who fail all three attempts are terminated from the program. This policy ensures that students have multiple opportunities to demonstrate their understanding of the material while maintaining academic standards.

Findings Description:

MS in IAC, Comprehensive Exam Results

Fall 2023

There were 5 students required to take the test for the following courses.

- COSC 5325 Operating System Security
    - 2 students received an A and thus were granted a waiver.
    - All 3 remaining students scored at least 80% on the test.
- COSC 5335 Database Security
    - 3 students received an A and thus were granted a waiver.
    - All 2 remaining students scored at least 80% on the test.
- DFSC 5310 Principle and Policy in Information Assurance
    - 4 students received an A and thus were granted a waiver.
    - 1 remaining student scored at least 80% on the test.
- DFSC 5315 Network and Cyber Security
    - 4 students received an A and thus were granted a waiver.
    - 1 remaining student scored at least 80% on the test.
- DFSC 5336 Business Continuity Management
    - 4 students received an A and thus were granted a waiver.
    - 1 remaining student scored at least 80% on the test.

Overall, all students who were required to take the comprehensive exam successfully passed, with each scoring at least 80%. This indicates that the program's preparation and support mechanisms were effective for the students who took the exam.

Spring 2024

We had one student in their terminal semester who received an A for all core courses, and thus was granted a waiver.

Summer 2024

We had two students in their terminal semester who received an A for all core courses, and thus were granted a waiver.

Findings

- High Passing Rates: All students required to take the comprehensive exam scored at least 80%, demonstrating strong overall performance.
- Effective Preparation: The consistent high performance on the comprehensive exams suggests that the program's preparation and support mechanisms are effective.
- Waivers Due to High Grades: The waiver system appears to be functioning as intended, with a significant number of students receiving waivers due to achieving an A in their core courses. This indicates that students who excel in their coursework are adequately prepared for the comprehensive exam.

RELATED ITEM LEVEL 3

Written Comprehensive Examination
Action Description:

Action Plan for MS in IAC's comprehensive exams:

- Maintain the current support and preparation strategies that have led to high passing rates. Regularly review and update the exam preparation resources and support services based on student feedback and performance data.
- While the waiver system is successful in reducing the number of students required to take the exam, evaluate if any adjustments are needed to better align with program objectives or address any emerging trends.
- Regularly review the comprehensive exam content to ensure it aligns with the current curriculum and adequately assesses the students' knowledge and skills. Update exam content if necessary to reflect any changes in the program or industry standards.
- Ensure that students are well-informed about the comprehensive exam requirements and waiver criteria. This will help maintain high levels of performance and minimize any confusion regarding the examination process.

RELATED ITEM LEVEL 1

Apply Knowledge And Skills In Projects And Real Work Environments
Performance Objective Description:
Students will practice and demonstrate their capabilities and skills relevant to information assurance and security in projects simulating real world tasks.

RELATED ITEM LEVEL 2

Final Capstone Project
KPI Description:
MS in IAC's Capstone Projects

Our MS in IAC offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in IAC students in Thesis Option are required to complete a Thesis, while students in Non-Thesis Option must complete a master's project.

- A thesis is typically a more extensive and in-depth research project. It involves conducting original research, often contributing new knowledge or insights to the field. Theses require a rigorous investigation, data collection, analysis, and interpretation of results. They are expected to be comprehensive and demonstrate a deep understanding of the chosen topic. The primary purpose of a thesis is to contribute new knowledge or advance the existing body of knowledge in the chosen field.
- On the other hand, a master's project is generally a smaller-scale endeavor compared to a thesis. It might involve applying existing knowledge to solve a practical problem or developing a prototype, application, or creative work. While it still requires research and analysis, the scope is usually narrower and more focused. Master's projects tend to emphasize practical application.

KPIs

Thesis

- Completion Rate: The percentage of students in the Thesis Option who successfully complete and defend their thesis by the end of their program.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their thesis.
- Publication and Contribution: The number of theses that result in a publication, presentation, or significant contribution to the field.
- Time to Completion: The average time taken for students in the Thesis Option to complete their thesis from the start of the project.

Master's Project

- Completion Rate: The percentage of students in the Non-Thesis Option who successfully complete and present their master's project.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their master's project.
- Timeliness: The average time taken for students in the Non-Thesis Option to complete their master's project from initiation to final submission.

Target Description:
The following targets are associated with each Key Performance Indicator (KPI) for the MS in IAC program:

Thesis

- Completion Rate: Aim for 90% or higher of students in the Thesis Option to successfully complete and defend their thesis by the end of their program.
- Grade Achievement: Target 80% or higher of theses to receive an "A" grade or its equivalent.
- Publication and Contribution: Aim for 25% of theses to result in a publication, presentation, or significant contribution to the field.
- Time to Completion: Average time for thesis completion should be within 2 semesters from the start of the thesis project.

Master's Project

- Completion Rate: Aim for 90% or higher of students in the Non-Thesis Option to successfully complete and present their master's project.
- Grade Achievement: Target 80% or higher of master's projects to receive an "A" grade or its equivalent.
- Timeliness: Average time for project completion should be within two semesters from the start of the project.

Results Description:
Results

Fall 2023

- Non-Thesis Option: Two students successfully completed their projects within two semesters, receiving grades of "A" and "B," respectively. One student completed their project within two semesters but received a "C." Additionally, two students required more time to finish their projects and thus delayed their completion.

Spring 2024

- Non-Thesis Option: One student was terminated due to non-attendance throughout the semester and was unable to complete their project. Another student from Fall 2023 paused their project and did not complete it. One student successfully completed their project within two semesters, receiving an "A.".

Summer 2024

- Non-Thesis Option: Two students completed their projects within two semesters, receiving grades of "A" and "B," respectively.

Findings

Thesis Completion

Since the Thesis Option was recently launched, no students were able to complete their theses during the 2023-2024 academic year. This result highlights the need for further evaluation of the support structures and timelines provided to students opting for the thesis track.

Master’s Project Completion

In Fall 2023, one student in the Non-Thesis Option completed their project within two semesters and received a "B" grade, indicating that while the project was completed on time, there is room for improvement in quality. Also, two students required more time to finish their projects, leading to delays in their completion. In Spring 2024, one student was terminated due to non-attendance, and another student from Fall 2023 paused their project and did not complete it. This highlights a need for better support mechanisms to address issues leading to project delays or terminations. However, there was a positive outcome as one student completed their project with an "A" grade. In Summer 2024, two students successfully completed their projects within the two-semester timeline, receiving grades of "A" and "B," respectively. These results indicate that while the program effectively supports students who complete their projects, there are areas for improvement in addressing the needs of students who face challenges such as terminations or pauses.

Program Effectiveness

The program's effectiveness is evident from the Spring 2024 and Summer 2024 results, where students received "A" grades for their projects, indicating high-quality outcomes and successful adherence to program standards. However, the varied grades in Fall 2023 suggest that there may be inconsistencies in the support and guidance provided to students, pointing to the need for a more uniform approach to ensure consistent quality across different terms.

Summer Term

No students completed a thesis or master’s project during Summer 2024, which suggests a lower number of active students during this period. This finding indicates the need to assess student engagement and project completion rates during the summer term, potentially adapting strategies to encourage continued progress and support for thesis and project completions throughout the entire academic year.

RELATED ITEM LEVEL 3

Final Capstone Project
Action Description:
Action Plans for MS in IAC's Casptone Projects

1. Continue to ensure that project proposals are reviewed within the first two weeks of the semester. Consider streamlining the review process if needed, and provide timely feedback to students to help them refine their proposals.
2. Maintain the structure of weekly progress meetings with project advisors. Ensure that these meetings are productive by providing guidelines for effective progress reporting and addressing any issues that arise.
3. Review the midterm evaluation process to ensure it effectively assesses students' progress. Collect feedback from both students and faculty to identify any areas for improvement in the evaluation process.
4. Ensure that the distribution of project activities among committee members is balanced and that all committee members are engaged in the evaluation process. Consider providing additional training or guidelines for committee members to enhance their effectiveness.
5. Evaluate the effectiveness of the final project presentations and provide constructive feedback to students. Consider implementing a formal feedback mechanism for both the presentation and the completed application to help students improve their work.
6. Periodically review the established procedures for managing projects to ensure they align with current best practices and address any emerging needs or challenges. Update procedures as necessary to improve the overall project management process.

7. Promote the identification of significant application development needs by encouraging students to engage with real-world clients or scenarios. Provide additional resources or support to help students address complex, real-world problems in their projects.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The GCC will conduct multiple meetings during the Fall 2023 and Spring 2024 semesters to discuss how to improve the below weaknesses identifed during DF program's review as we were of the view that the recommendations applying equally to the IAC program.:

1. Low student enrollment
2. Low student degree conferred
3. No Thesis option

Update of Progress to the Previous Cycle's PCI:

The registration status for the previous academic year (MS in IAC), based on data from the SHSU Enrollment Fact page, is as follows:

- 2022-2023
  - Fall 2022: 29
  - Spring 2023: 24
  - Summer 2023: 11
- 2023-2024
  - Fall 2023: 23
  - Spring 2024: 23

Actions taken during 2023-2024

- Recruitment Scholarships: To address low student enrollment, we have introduced recruitment scholarships with support from the Dean's office. This initiative offers $1,000 to students who register early, with the first 30 students receiving this benefit. As of May 12, 24 students have registered and been notified of the awards, including 12 from the Computer Science program.
- Advertising to New Students: To enhance student recruitment, we conducted new student orientations at least once a month. These orientations help lift advising holds promptly and highlight the scholarship program, encouraging early registration and securing benefits.
- Remedy for STEM/Preparatory Students: We identified that several STEM/Preparatory students were on the verge of leaving the program due to financial aid issues with their courses. We addressed this by working with the Registrar's office, Financial Aid office, and other departments to ensure these courses are now covered by financial aid, resulting in improved retention.
- Program Options: The addition of *Professional* and *Thesis* options for the DF program has been approved and has been available starting Fall 2024. This addition has aimed to provide more flexibility and enhance the program’s appeal.

New Plan for Continuous Improvement Item

Closing Summary:

Continue offering recruitment scholarships to attract new students. Expand the scholarship program if possible and ensure that the promotion of these scholarships is well-publicized during orientations and through other channels.

Ensure that financial aid coverage for STEM/Preparatory courses is maintained. Regularly review and adjust financial aid policies to support students effectively and retain them in the program.

Discuss implementing additional support mechanisms for students working on their theses and projects.

Continue to monitor the impact of the Professional and Thesis Options and make necessary adjustments based on student enrollment trends and feedback.

Department of Engineering Technology

Construction Management BS

Demonstrate Construction Management Knowledge and Skills

Goal Description:

Students will demonstrate knowledge and skills relevant to Construction Management.

Providing Department: Construction Management BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Development Of Students' Knowledge And Skill

Learning Objective Description:

Students will be able to demonstrate competency in key areas of Construction Management by successfully displaying skills in an Estimation Course. The Estimation Course serves as a capstone requirement with required skills in construction math, material pricing, bid tabulation, and project scheduling.

RELATED ITEM LEVEL 2

ETCM 4310 Construction Cost Estimating - Knowledge and Skills

Indicator Description:

The proposed indicators focus on evaluating the effectiveness of the teaching and learning process specific to cost estimation techniques, principles, and skills:

- Demonstrates knowledge of basic cost estimation principles, methods, and terminology.
- Understands the relationship between cost estimation and project planning.
- Shows comprehension of key cost factors, such as labor, materials, overhead, and contingencies.
- Applies appropriate units of measurement and cost estimation techniques.

Utilizes various cost estimation methods to different project scopes and complexities.

Criterion Description:

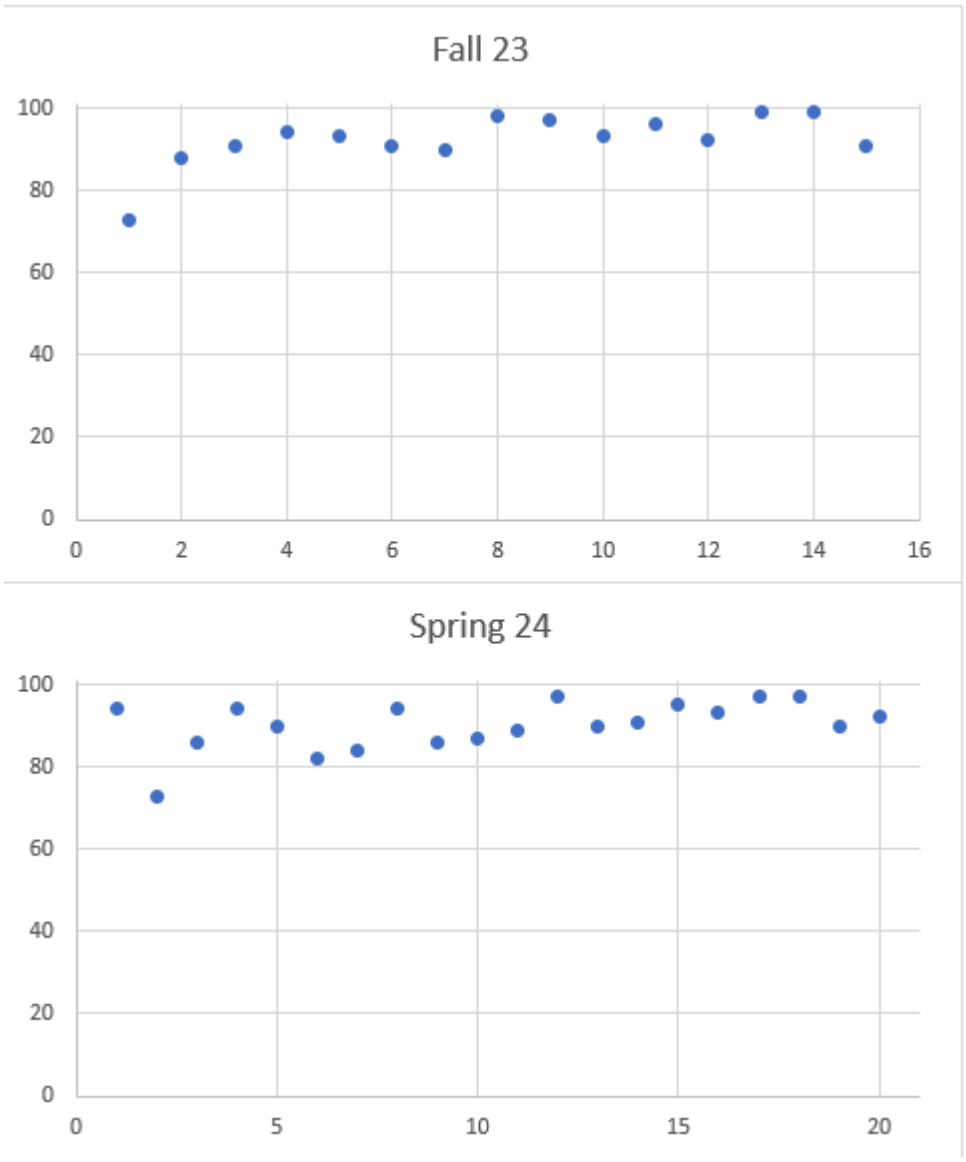
To evaluate students' knowledge of basic cost estimation principles, methods, and terminology, and their understanding of the relationship between cost estimation and project planning, two homework assignments were employed. These assignments required students to apply cost estimation principles and methods for a project scenario. The students' ability to accurately analyze project requirements and generate realistic cost estimates was evaluated.

To evaluate students' comprehension of key cost factors and their ability to apply appropriate units of measurement and cost estimation techniques, two homework assignments were employed. The students were provided with project scenarios and asked to develop a cost estimate using the appropriate techniques and terminology. Their ability to accurately analyze project requirements and generate realistic cost estimates was evaluated.

The students' knowledge of various cost estimation methods to different project scopes and complexities was evaluated by written exams. The midterm and final exams included questions about different estimation techniques, cost factors, formulas, and industry standards.

Findings Description:

For Fall 2023, the class consisted of 15 students. Out of these, 14 students successfully scored 75% or higher, translating to 93.33% of the class meeting the benchmark. This significantly exceeds the set benchmark of 80%. In Spring 2024, the class size increased to 22 students. From this group, 20 students scored 75% or higher. The compliance rate in this instance was 91.67%, again surpassing the established benchmark of 80%. These results indicate strong performance across both semesters, with a consistent majority of students achieving scores above the set threshold. This trend demonstrates effective teaching strategies and student comprehension of the material.



In the academic terms of Fall 2023 and Spring 2024, students were assessed against the benchmark requiring that at least 85% score a minimum of 4 on a 5-point rubric in their final project evaluations. During Fall 2023, 93.33% (14 out of 15) of the students met or exceeded this benchmark, with a significant majority scoring the maximum of 5. The performance trend continued upward in Spring 2024, where 95% (21 out of 22) of the students achieved scores of 4 or above, including a substantial number securing the top score. These results indicate a consistent surpassing of the benchmark and highlight the effectiveness of the curriculum and instructional strategies, underscoring strong student capabilities and dedication across consecutive academic terms.

RELATED ITEM LEVEL 3

ETCM 4310 Construction Cost Estimation- Knowledge and Skills

Action Description:

1. Enhance Instructional Methods:

Action: To further improve exam performance, the course will incorporate real-world cost estimation scenarios, allowing students to apply theoretical knowledge in a practical setting.

Responsible Group: Course instructors.

Completion Date: To be implemented from the start of the next academic year.

Rationale: a need for more practical, application-based learning opportunities.

2. Review and Expand Course Content:

Action: The curriculum will be reviewed to ensure it includes the latest industry standards and technologies related to cost estimation. This may include guest lectures from industry professionals and updates to course materials.

Responsible Group: Course instructors.

Completion Date: To be implemented from the start of the next academic year.

Rationale: address the need for students to be exposed to current and comprehensive industry practices.

4. Strengthen Assessment Methods:

Action: Develop a more robust rubric for the final project evaluation, with clearer criteria that align closely with industry expectations.

Responsible Group: Course instructors.

Completion Date: To be developed and ready for use in the next academic year.

Rationale: The need for a more detailed rubric was identified based on the variance in project scores and the goal of achieving greater consistency and alignment with professional standards.

Develop Professional Skills

Goal Description:

Students will gain necessary work force experience to compete in the construction field.

Providing Department: Construction Management BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Professional Skills

Learning Objective Description:

Students completing the BS in Engineering Technology will demonstrate skills necessary to compete in the professional marketplace through an internship.

- Students completing the BS in Engineering Technology will demonstrate skills necessary to compete in the professional marketplace through an internship.
- Students will establish a professionalism to be ready to start their successful careers in each professional field through an internship.
- Students will improve their written, oral, and graphical communication skills with stakeholders in each professional field to maintain professional working relationships.

At the conclusion of these courses, the student will have demonstrated successfully the following competencies:

1. Work in an Industrial Environment.
2. Work in either a Field Management, a Construction Management, a Superintendent Management, Project Management, Safety Management or combinations of responsibilities.
3. Develop the required reports and maintain progressive reviews that identify the progress being made on the project.
4. Supervise workers in the various trades that are under their responsibilities.
5. Write change orders on specification sheets.
6. Prepare project documents and resources to support the activities for a project.
7. Communicate with subcontractors and maintain professional working relationships.
8. Write and maintain punch list and other required documentation.
9. Exhibit characteristics associated with successful employment in industry.

RELATED ITEM LEVEL 2

ETEC 4391 Internship Evaluation

Indicator Description:

Students enrolled in the program should complete ETEC 4391 in the end of their third or final year (Junior or Senior) of enrollment.

ETEC 4391 addresses key concepts and skills, as well as practical demonstrations of competency relevant to the field of each program in the Department of Engineering Technology. All students in this course will be evaluated by their internship supervisor and by their course instructor on a faculty-developed rating scale.

Students need to meet the below student eligibility to register ETEC4391 for 3 credits or 6 credits.

- Minimum semester hours - 32 hrs. Including 21 within the academic major for your degree program or the 15 within the academic minor for your minor program. Some internships may specify courses / content to have been completed.
- Minimum grade of “C” or higher in ENG 1301 and 1302 or equivalent.
- Transfer students become eligible upon the successful completion of one full-time semester if all other eligibility requirements are fulfilled and apply according to

instructions on announcements.

8. Special information regarding Industrial Technology Trades and Industry Certification Program internships (ETEC 4391) - Due to the unique structure of this program, the above listed eligibility requirements do not apply. See the Trades and Industry Certification Program coordinator regarding specific requirements for this program.

The students in ETEC 4391 in Summer 2022 were evaluated by the following detail rubric:

COURSE EVALUATION – GRADING: 100 POINT SCALE

Weekly Reports [10 weekly reports]	20 Points
Summary of Syllabus	3 Points
Resume	3 Points
LinkedIn	2 Points
EMAIL Communication Skills	2 Points
ONLINE Video Review and Summary (1 video)	10 Points
FINAL SUMMARY PAPER	20 Points
FINAL SUMMARY PRESENTATION	20 Points
Supervisor's Evaluation	15 Points
Supervisor's working hour verification letter	5 Points
TOTAL	100 Points

Grade Scale - Final grades will be based upon the following points.

Your final numerical point will ROUND OFF to THE NEARNEST WHOLE NUMBER.

A = +90 Points

B = 80 – 89 Points

C = 70 – 79 Points

D = 60 – 69 Points

F = under 60 Points

Criterion Description:

It is expected that at least 85% of the students enrolled in ETEC 4391 will achieve above average standard (B or higher) of performance on the supervisor evaluation rating scale and the final letter grade. In general, if the students in ETEC 4391 miss to submit any assignments, the assignments not submitted will impact their final grades by two letter grades.

All assignments should be submitted to Blackboard by the specific due dates as below.

Assignments	Due Date
10 Weekly Reports (Weekly Logs) (6/1/2022 – 8/2/2022: 10 weeks)	By Midnight, Every Sunday i.e. The 1st Weekly Report (5/30/2022-6/3/2022) → By Midnight, 6/5/2022 (Sunday)
Summary of Syllabus	6/5/2022
Resume	6/5/2022
LinkedIn	6/12/2022
ONLINE Video Review and Summary (1 Video)	6/19/2022
EMAIL Communication Skills	No due date. (Based on your email communication between a student and an instructor)
FINAL SUMMARY PAPER	7/24/2022
FINAL SUMMARY PRESENTATION	7/24/2022
Supervisor's Evaluation	7/24/2022

Supervisor’s working hour verification letter	7/24/2022

Weekly Reports are due Midnight, Every Following Sunday:
Follow and use the format as posted on Blackboard.
Don’t modify the template and fill in every required information on the format.
Please describe your daily activities as specific as you can like the sample.
If your internship begins before the semester, please fill out your daily activities to the attached template and submit your weekly reports to the first week of summer semester.
For instance, if your internship begins 5/15/2023, please write 2 weekly reports from 5/15 to 5/19 and from 5/22 to 5/26 and submit 2 weekly reports with the 1st weekly report (5/29-6/2) to the folder of the 1st weekly report.

Resume:
Example will be on Blackboard – follow the example closely. Upload all your Weekly Reports to ETEC4391-1 on Blackboard before or on due date posted on Blackboard.

LinkedIn Profile:
You will develop a professional LinkedIn profile as a requirement for ETEC 4391, and you should update your profile including your current internship. And then please link your profile to Dr. Min Jae Suh and the LinkedIn page of “Sam Houston State University - Engineering Technology”.

Summary of Syllabus:
This course is an online course, and the course instructor confirms that students read a course syllabus carefully or not. Students summarize key points or core contents after reading the course syllabus.

Email Communication Skills:
When you send your email properly and professionally to a course instructor. One of the purposes of this courses is to improve your professional commination skills. Additionally, the email is the best way to communicate between the instructor and the student because this is ONLINE courses. Please check your school email once a week at least!

Video Review and Summary:
An announcement/notification will be posted to ETEC4391-1 on Blackboard including the link to the video. You will watch the videos and summarize the video topics. 1-page summary should be uploaded before or on the due date to Blackboard.

Supervisor’s Evaluation:
Download the Supervisor Evaluation from Blackboard. Have your immediate supervisor complete the evaluation and email it to Dr. Min Jae Suh, mjs068@shsu.edu

Supervisor’s Working Hour Verification Letter:
The letter should include student’s total working hours at a jobsite to verify complete student’s working hours and potential future working hours to meet 300 working hours or 600 working hours. The letter should be prepared by student’s supervisor or HR and include his/her signature in the letter. There is no specific format, but you can find samples for this letter.
Based on your working hour verification letter, I can confirm you can make 300 working hours or 600 working hours during your internship before or after Summer 10 Semester.
Please see the samples!

Final Summary Paper:
Submit a 2-3 page, 1.5-spaced paper. The paper should describe the history of the company in which you are interning, the job title and description for your position, the actual activities / duties / job tasks you completed while interning and your personal thoughts of the internship such as pros and cons.

Final PPT or Video Presentation:

Create a Power Point presentation that illustrates your internship experience. You will need to include pictures showing the projects / activities you performed.
Upload the presentation file to Blackboard on or before the due date.
OR
Create a 4-5 minute video that describes your experience using a self-recording.
For both of the presentations you need to identify the company, job title, skills you learned, location, travel expected, activities and/or duties you preformed, and pros and cons of your internship. Also include examples of the classes you have taken that supported your experience and skills you think should be included or added to the courses of your major.

Findings Description:

There were 68 Engineering Technology students enrolled in ETEC4391-01 and/or 02 in Summer 2023. The number of students in ETEC4391-01 and/or 02 was increased by one student. Most students successfully completed this course in Summer 2023. The summary of our findings in relation to the learning objectives is shown in the table below.

Summarized Students' Course Achievements	
Directly supported learning objectives and student outcomes:	-Students completing the BS in Engineering Technology will demonstrate skills necessary to compete in the professional marketplace through an internship. 1.Work in an Industrial Environment. 2.Work in either Field Management, Construction Management, Superintendent Management, Project Management, Safety Management, or combinations of responsibilities. 3.Exhibit characteristics associated with successful employment in industry.
	-Students will establish a professionalism to be ready to start their successful careers in each professional field through an internship. 4. Develop the required reports and maintain progressive reviews that identify the progress being made on the project. 5. Supervise workers in the various trades that are under their responsibilities. 6. Write change orders on specification sheets. 7. Prepare project documents and resources to support the activities for a project.
	-Students will improve their written, oral, and graphical communication skills with stakeholders in each professional field to maintain professional working relationships. 8.Communicate with subcontractors and maintain professional working relationships 9.Write and maintain punch list and other required documentation.

Student's internship supervisors submitted their supervisor's evaluations with their evaluation rating scale and observations to a course instructor, and the evaluation rating was determined by immediate student's internship supervisor using 5 rating scale from A to F and it was based on the performance of internship student at their jobsite during their internship program. 93% of internship students received 'A' from their internship supervisors and 6% of internship students received 'B'. Therefore, 99% of students in this course achieved an A or B from their internship supervisor at their internship employers. Only one student out of 68 students could not receive a student's supervisor's evaluation from a supervisor. The percent in Summer 2023 was almost the same as Summer 2022 and the percent was higher than the target percentile of ETEC4391-1 and/or 2 in summer 2023.

99% of students completed the course in Summer 2023 and 91% of students successfully received above average final letter grades, A or B, at the end of semester. The summary of the distribution of final letter grade is as follows: 91% of students in ETEC4391-01 and/or 02 students achieved above the average final letter grade, and the percentile is higher than the target of criterion, at least 85%

of the students enrolled in ETEC 4391 will achieve above average standard (‘B’ or higher). 4% of students achieved ‘C’, 3% of students achieved ‘D’, and 1% of students could not pass this course in Summer 2023. Overall, the percentile of students who received above average standard (B or higher) was almost similar to Summer 2022.

RELATED ITEM LEVEL 3

ETEC 4391 Internship Evaluation

Action Description:

To improve this course, a course instructor considers students’ professionalism at their workplaces and work ethics. That is the reason why the instructor wants to see their communication skills and weekly logs as one of assignments. Also, the instructor wants to see their professional writing skills and presentation skills through weekly logs, final presentation, and final reports. The instructor tries to develop online supervisor’s evaluation form to provide more convenience to student’s supervisors and improve the efficiency to integrate supervisor’s feedback for our students.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The BS in Construction Management keeps updating the course curriculum to meet the ABET ANSAC requirements, the needs of students, and the demand of construction industry. Concurrently, the program tries that all equipment, manpower, and other needs will be provided to implement revised curriculum for students in Construction Management without any challenges or barriers.

Update of Progress to the Previous Cycle's PCI:

The BS in Construction Management revised course curriculum and restructured the course flow to offer the effective course order for CM students. The revised curriculum and course flow can provide more educational options to students in Construction Management and meet the current industry needs. In addition, CM faculty will keep developing new course to follow the trend of construction industry and new student’s needs.

New Plan for Continuous Improvement Item

Closing Summary:

The BS in Construction Management keep updating the course curriculum to minor discrepancies between academia and construction industry and to meet the ABET ANSAC requirements. Also, CM faculty keep monitoring the needs of students to offer innovative courses and improve educational environment. Concurrently, the program tries that all equipment, manpower, and other needs will be provided to implement revised curriculum for students in Construction Management without any challenges or barriers.

Starting from the next academic year, we will integrate practical, real-world experience in cost estimation, which will help bridge the gap between theoretical knowledge and practical application. This initiative, led by the course instructors and supported by the curriculum development team, aims to improve exam performances by providing students with a hands-on learning environment.
Additionally, we will undertake a review and update of the curriculum to include the latest industry standards and technologies, with the updated content ready for the start of the next semester. Moreover, a detailed rubric for evaluating final projects will be developed and implemented in the next academic cycle. This rubric will provide clearer criteria that reflect industry expectations and ensure a consistent and rigorous assessment of student projects.

Finally, we will establish regular semesterly review meetings to assess the effectiveness of these actions and make necessary adjustments.

Electronics and Computer Engineering Technology BS

Develop Knowledge And Skills

Goal Description:

1. Graduates will apply principles of science, technology, engineering, and mathematics to solve real-world problems.
2. Graduates will apply their theoretical knowledge to design, build, test, analyze, and improve broadly defined engineering problems appropriate to electronics and computer engineering technology (ECET) disciplines.
3. Graduates will effectively use communication and project management skills in oral, written, visual, and graphic modes within interpersonal and team environments in the ECET disciplines.
4. Graduates will grow professionally practicing life-long learning through self-study, continuing education, participation in technical societies, and/or pursuit of professional certification.
5. Graduates will evaluate the social and ethical implications of their work and will comply with all codes and regulations governing their work.

Providing Department: Electronics and Computer Engineering Technology BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Development Of Students' Knowledge And Skill

Learning Objective Description:

1. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the ECET discipline.
2. Design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the ECET discipline.
3. Apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.
4. Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.
5. Function effectively as a member as well as a leader on technical teams.

RELATED ITEM LEVEL 2

ETEE 2320 Circuits and Systems

Indicator Description:

The students enrolled in Fall 2023 were evaluated based on the following rubric:

Mid-term Exam	**20%**
Final Exam	**20%**
Laboratory Experiments	**15%**
Homework Assignments	**15%**
Attendance, Observed performance & Attitude	**10%**
Class Design Project and Presentation	**10%**
Quizzes (5-8 quizzes)	**10%**
Total	**100%**

There were 24 students in ETEE 2320 Circuits and Systems class during Fall 2023 semester. The student work included the following: one midterm exam, one final exam, eight quizzes (including take home and in-class pop quizzes), seven homework's and 12 lab projects with

technical reports. Students also gained their 10% of class grading based on their attendance, class participation and attitude.

The tests included fundamentals of AC circuit theory, applications of inductors (Ls), capacitors (Cs), and series and parallel combination of RLC circuit parameters, resonance, AC passive filters, frequency response, voltage, Current, Power relations, series and parallel AC circuits, ideal transformer, single phase and three-phase transformers, single phase and three phase electrical power circuits applied to industrial environments, using (j) complex parameter and complex analysis of AC circuits, real power, reactive power, and apparent power relations, power factor correction in industrial environments, efficiency concept, electrical measurements, and AC circuit troubleshooting.

Extensive labs on oscilloscope use were introduced. 12 Lab projects were required for each student and students could make up the missed labs with reported justifications. The lab projects aimed to gain extensive amount of hands-on skills and experience on the introduction of AC electrical circuits, safety, wiring, measurements, testing, and the troubleshooting open circuit and short circuit phenomena.

Extensive use of NI MultiSIM software was provided. After the first homework assignment, all other assignments included at least one design question on AC circuit analysis with NI MultiSIM digital software tool.

Criterion Description:

As suggested by the course Instructor and agreed by other ETEC faculty most students (70%) should be able to get a grade of C (70% or higher with a curve in the class as needed) or higher. The final project with a 10% course grade was required by each student and presented in the class. Similarly, the lab projects included knowledge and skills of AC circuits theory and students were provided extensive hands-on and minds-on experience on many practical AC electrical circuits and systems.

Findings Description:

ETEE 2320 Circuits and Systems

There were 24 students in ETEE 2320 class in Fall 2023. Following is a summary of our findings in relation to the learning objectives.

Summarized Students' Course Achievements of Program Outcomes Form
Course Name: ETEE 2320 Circuits and Systems, Fall 2023 **Instructor**: Dr. Reg Pecen

Directly supported Goals and learning objectives	***SLO1.*** **Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the ECET discipline (SLO 1)** ·Intro to AC, current I and voltage V, Phase shift, oscilloscope use, ·Capacitors ·RC Circuits Analysis using Complex Variables, TI-84 or better use/digital tools ·Inductors ·RL Circuits Analysis ·R, L, C Elements, Circuits, Impedance Concept, real-power P, reactive -power Q, apparent-power S relations, measurement. ·Transformers – Ideal Trf, Single and 3-Phase Transformers. ·Time Response of Reactive Circuits.
	SLO2. Design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the ECET discipline (SLO2).
	SLO3. Apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature (SLO3).
	SLO4. **Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes (SLO4)** •Students completed 11 labs as individual on 24 lab stations. •Lab experiments included: The oscilloscope and Sin Wave Measurements, Capacitors, Inductors, Charge and Discharge of Caps, Inductor operation, Series and Parallel RLC circuits, RC and RL Response, RLC Circuit Response, Series and Parallel Resonance, Passive Filter Circuit Design including low pass, high pass, band pass, and band stop filters and operation, Transformers (Trf), Trf operation.
	SLO5. **Function effectively as a member as well as a leader on technical teams (SLO5).** ·Students submitted technical lab reports with typed conclusion section. For each lab (11 of them), every student submitted a lab report to summarize what they have learnt and how the circuit theory and experiments complement to each other. ·13 student groups worked on 13 separate class design projects that included phases of design, breadboarding, testing, operating, troubleshooting, and soldering (extra credit only). All student groups submitted technical project reports that included a problem definition, objectives, technical methodology, breadboarding, PCB soldering (optional for extra credit), simulation and results with tables and graphics as needed. ·Each project group (of two students) required to present formally in front of their peer students for 10 minutes on their applied research project implementation, problems faced, how they resolved, demonstration of their circuit, and finally answering questions from other students. Students also evaluated each project except their own and instructor used them for his final project grade calculations.

Total number of students assessed (N_s): 24 during Fall 2023, 1 student earned D, 1 student failed.

SLO 1	**Average (M_s):** Mid-Term: 56.3% Quizzes: 84.8% Final Exam: 70.6%	**Standard deviation (σ_s):** Mid-Term: 16.0 Quizzes: 5.4 Final Exam: 16.5
SLO 2	**Average (M_s):** Project Proposal: 78.0% Project Report: 72.8% Project Presentations: 89.4%	**Standard deviation (σ_s):** Project Proposal: 10.0 Project Report: 8.9 Project Presentations: 8.7
SLO 3	**Average (M_s):** Project Report & Project Presentations: 75.4%	**Standard deviation (σ_s):** Project Report & Project Presentations: 9.7
SLO 4	**Average (M_s):** Lab Work: 90.8%	**Standard deviation (σ_s):** Lab Work: 4.0
SLO 5	**Average (M_s):** Team Work/Total Project: 97.3%	**Standard deviation (σ_s):** Team Work/Total Project: 15.8
Total Grading	**Average (M_s):** Final Grade: 76.4%	**Standard deviation (σ_s):** Final Grade: 9.6

A breakdown for the course assessment numbers is shown below:

ETEE 2320	Fall 2023
Above Average/Excellent (80%+)	37.5% (8)
Met Expectation (70%+)	33.3% (8)
Needs Work/Developing (60%+)	25% (6)
Below Par (Less than 60%)	4.2% (2)
Total	24 students (100%)

Unfortunately, students continue to experience attendance problems due to multiple reasons. Most common reason was work hours and family emergencies of few students that caused them to miss the classes. One of the other challenges is familiarity with Complex Calculator such as TI-84 or better. It took few weeks to be able to teach TI-84 use for complex variables and complex calculations. Two students did not have TI-84 or better calculator. Students appreciated efforts on face-to-face education and office hours. The laboratory projects were all completed as face to face in Pirkle 140 and 142 electronics labs in both Fall 2023.

Students were required to rent or buy e-copy of textbook as we had confirmed with university

bookstore for low-cost rental or purchase of e-book version of the textbook. Having a cost-effective e-textbook has improved the student success. Instructor (Dr. Pecen) also arranged two additional tutorial sessions that helped student success rate during Fall 2023.

1. Increase student success rate in major courses to a minimum of 70% or C.
2. Students shall appropriately cite and quote scientific papers, use standard publications format such as IEEE, demonstrate proper written and oral presentation mechanics.
3. Junior and senior students in major courses should complete a final class project to design, implement, troubleshoot, and demonstrate a model or prototype. \
4. Monitoring attendance more rigorously for upper-level courses.
5. Face-to-Face office hours/meetings with underperforming students.
6. Tutoring sessions with TA or instructor as time allowed.
7. Consider extra credit opportunities for NI MultiSim Simulation as well as PCB Soldering work that can be added to class project that will be presented and demonstrated in the last day of the class. port to regional conferences and encourage students to go and present if accepted.

- The overall class average was 83.1%. 91.7% of all enrolled students got C or better which met the course expectation of C or better.
- All students showed reasonable learning and hands-on skills for 11 lab projects with 90.8% average lab grade. This number is higher than the target number of 70%.
- The success rate on the class design project is 97.3% which is much higher than the overall class goal of 70% success rate.
- 8 out of 24 students earned a grade of A, 8 students earned a grade of B, 6 students earned a grade of C, and 1 student earned D, and 1 student failed.

RELATED ITEM LEVEL 3

ETEE 2320 Circuits and Systems

Action Description:

1. Monitoring attendance more rigorously for upper-level courses.
2. Face-to-Face office hours/meetings with underperforming students
3. Tutoring sessions with TA or instructor as time allowed
4. Submit the 4-page technical report to regional conferences and encourage students to go and present if accepted.

RELATED ITEM LEVEL 2

ETEE 3345 Digital Electronics

Indicator Description:

The students enrolled in Spring 2024 were evaluated based on the following rubric:

Mid-term Test	**20%**
Final Exam	**20%**
Laboratory Experiments	**30%**
Homework Assignments (Best Two out of Five)	**10%**
Attendance	**5%**
Final Project	**15%**
Total	**100%**

Each student submitted five HW's based on the lectures given on Number systems, Gates, Boolean Algebra, De-Morgan's, Logic Minimization, Flip-Flops etc. Best three among five HW were considered for the grade calculation (10%) The students had to sit for two exams – mid-term (20%) and Final (20%). Mid-term exam on number Systems, basic of digital electronics, logic minimization, De-Morgan's and gates; final exam on Latches, Counters, Shift Registers, different applications like MUX/DEMUX, Encoder/Decoder, Half/Full Adder etc. The students had to attend 13 LABS (30%) and did troubleshoot problems associated with different aspects of this course. For example, one lab was on 4-bit adder, another was on shift register. Each student was assigned in a group of two and worked on final project (15%). Students had to build prototype for their final project and demonstrate to the peers alongside PowerPoint slides. They needed to submit a technical report in IEEE conference format on their project. 5% grade was assigned for attendance, respecting deadline, and attitude.

Criterion Description:

This course is a study of the principles and applications of digital logic circuits including number systems; logic gates; counters; shift registers; sequential and combinational logic circuits; and laboratory experiences consist of experimental problems. The Engineering Technology programs generally assess the criterion description of at least 70% of the students will perform at an acceptable level. As suggested by the course Instructor Dr. Basith, most students (70%) should be able to get a grade of C (70%) or higher.

Findings Description:

There were 25 total students enrolled for Spring 2024. Following is a summary of our findings in relation to the learning objectives.

Summarized Students' Course Achievements of Program Outcomes Form
Course Name: ETEE 3345 Digital Electronics, Spring 2024 **Instructor**: Dr. Iftekhar Ibne Basith

Directly supported Goals and learning objectives:	1. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the ECET discipline: ·Different number systems and conversion between them. ·Logic Gates, Boolean algebra, sequential logic, minimization. ·Timing Diagram, multi-level gating. ·MUX/DEMUX, Half/Full Adder, Comparator, Encoder/Decoder. ·Shift registers: Serial In – Serial Out, Serial In – Parallel Out, Parallel In – Serial Out, Parallel In – Parallel Out. ·Counters, Ring counter, Johnson Counter, Asynchronous and Synchronous counters.
	2. Design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the ECET discipline appropriate to the ECET discipline: . Students are required to build, test and troubleshoot a prototype. . Some examples: build a media device capable of playing and streaming movies, tv shows, and games; Arduino Flex Sensor Controlled Robot Hand; Elevator with digital floor indicator etc.
	3. Apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature: ·All students needed to submit a 4-page report on their project in IEEE conference format. ·Each group required to present in front of their peer for 6-7 minutes on their project implementation, problems faced, and how they resolved. ·For each lab (13 of them), every student is required to upload a LAB report to summarize what they have learnt on corresponding day and how theory and experiments complement each other.

	4. Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes: ·Students used FESTO LabVolt system to finish 13 labs.
	5. The students will be able to function effectively as a member or leader on a technical team: ·Students teamed up as 2 members in a group. ·Students evaluated other groups and their own team member.

Total number of students assessed (N_s): 25 during Spring 2024		
Exams	Average (M_s): Mid-Term: 45.35% Final Exam: 57.35%	Standard deviation (σ_s): Mid-Term: 3.66 Final Exam: 3.54
Class Project	Average (M_s): Final Project: 93.72%	Standard deviation (σ_s): 0.75
LABS	Average (M_s): LABS: 70.66%	Standard deviation (σ_s): 3.71
HW (Best Three)	Average (M_s): HW: 88.2%	Standard deviation (σ_s): 1.52
Total Grading (BEFORE curve)	Average (M_s): Final Grade: 69.21%	Standard deviation (σ_s): 9.95
Total Grading (AFTER curve)	Average (M_s): Final Grade: 75.50%	Standard deviation (σ_s): 9.95

The whole course grade breakdown (out of 100)		
	After CURVE & BONUS	Before CURVE & BONUS
Above average/ Excellent (80%+)	12% (3)	40% (10)
Met Expectation (70%+)	36% (9)	32% (8)
Needs Work/ Developing (60%+)	28% (7)	28% (7)
Below Par (Less Than 60%)	24% (6)	0% (0)
Total	100% (25)	100% (25)

RELATED ITEM LEVEL 3

ETEE 3345 Digital Electronics

Action Description:

1. Monitoring attendance more rigorously for upper-level courses.
2. Face-to-Face office hours/meetings with underperforming students
3. Tutoring sessions with TA
4. Submit the 4-page technical report to regional conferences and encourage students to go and present if accepted.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

- We are updating our curriculum to have Senior Design I as 1 credit hours in Fall semesters where students will prepare and submit their capstone proposal. Then Senior Design II will be in following Spring semesters for prototyping, debugging, demonstration, and troubleshooting.
- We are looking to connect with CISCO for a potential wireless router and networking lab setup through their educational donation program. We are working with Computer Science department in this regard.
- Based on market analysis and IAB recommendation, we are planning to offer a special topic course titled “PCB Design” in Fall 2023. Based on student feedback and enrollment, we may add this course in our curriculum as elective in future.
- We are exploring the Accreditor for Technology, Management and Applied Engineering (ATMAE) accreditation for Engineering technology – Electronics Concentration (ETEE) for upcoming year.
- We are also reviewing the National Center for Construction Education and Research (NCCER) books for possible certificate/certification for ECET/ETEE students.
- We have submitted budget requests for at least one or two FANUC robotic arms, various EMS modules for power classes, 3-phase transformers, generators, and many other required lab resources. We are investigating funding opportunities to add additional electrical power and machinery lab modules that will cost about $50K for increased enrollment in ETEE 3360 Electrical Power and Machinery course due to fast-growing MET program enrollment.

Update of Progress to the Previous Cycle's PCI:

We are updating our curriculum to have Senior Design I as 1 credit hours in Fall semesters where students will prepare and submit their capstone proposal. Then Senior Design II will be in following Spring semesters for prototyping, debugging, demonstration, and troubleshooting.
Update: In Fall 2024, ETEC will offer 3 sections of ETEC 4099 Engineering Innovation (name change to Senior Design I and course number update to ETEC 4199 will be effective next academic cycle). In Spring 2025, ETEC will offer 3 sections of ETEC 4399 Senior Design I (name change to Senior Design II will be effective next academic cycle)

- We are looking to connect with CISCO for a potential wireless router and networking lab setup through their educational donation program. We are working with Computer Science department in this regard.
Update: Still work-in-progress.

- Based on market analysis and IAB recommendation, we are planning to offer a special topic course titled “PCB Design” in Fall 2023. Based on student feedback and enrollment, we may add this course in our curriculum as elective in future.
Update: ETEE 4369 – PCB Design was offered in Fall 2023, but class never made.

- We are exploring the Accreditor for Technology, Management and Applied Engineering (ATMAE) accreditation for Engineering technology – Electronics Concentration (ETEE) for upcoming year.
Update: Engineering Technology concentration on Electronics (ETEE) is unofficially ATMAE accredited. We had a site visit in March 2024, and the official announcement will be in October 2024 during ATMAE Annual conference in Las Vegas, NV.

- We are also reviewing the National Center for Construction Education and Research (NCCER) books for possible certificate/certification for ECET/ETEE students.
Update: Still work-in-progress, faculty are still reviewing the NCEER textbooks.

- We have submitted budget requests for at least one or two FANUC robotic arms, various EMS modules for power classes, 3-phase transformers, generators, and many other required lab resources. We are investigating funding opportunities to add additional electrical power and machinery lab modules that will cost about $50K for increased enrollment in ETEE 3360 Electrical Power and Machinery course due to fast-growing MET program enrollment.

Update:

- One new robotic arm is delivered and installed as of August 2024.
- Additional electrical power trainers with multiple power modules in the approximate amount of$27,000 were purchased in fall 2023 and installed. The equipment improved lab opportunities in ETEE 3360 Electrical Power and Machinery class.
- There are also additional 12 NI LabVIEW myDAQ modules were purchased to provide unique experience to students in ETEE 4352 Instrumentation and Interfacing class.
- Small laboratory components for ETEE 2320 Circuits and Systems course including transformers, resistors, capacitors, LEDs, etc. were purchased.

New Plan for Continuous Improvement Item

Closing Summary:

- Electronics and Computer Engineering Technology (ECET) have applied for ABET accreditation. Initial readiness review was approved in January, and Self-study report was filed July 1st, 2024. We will have an ABET team visit in October 6-8, 2024.
- As per ATMAE recommendation, we may hire a fulltime instructional technician for ECET labs.
- We continue to add IAB members for ECET from related fields. As of now, we have 15 IAB members.
- As part of ABET accreditation, we have revised and continue to update our PEOs (Program Educational Objectives) and SLOs (Student Learning Outcomes).
- A new proposal is being submitted for the potential name change of Engineering Technology concentration in Electronics to Mechatronics concentration.
- There is a need for Festo Smart Sensor training modules and each cost about $9,500. We will work on potential sources to fund at least 5 modules of Festo Sensor Workbenches in near future.
- There is need for at least one more Robotic Arm, and last one cost us around $38K.

Engineering Technology BS

Develop Knowledge And Safety Skills

Goal Description:

Students will learn the skills necessary to compete in the professional marketplace. This course provides an opportunity for students to gain an increased understanding and knowledge of safety consciousness, safety precautions and procedures in an industrial environment.

Providing Department: Engineering Technology BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Development Of Students Knowledge And Skills

Learning Objective Description:

Students will demonstrate competency in key areas of engineering technology by passing the OSHA Safety Course and receiving OSHA Certification. The OSHA Certification serves as a capstone requirement. The test is administered by an external agency.

RELATED ITEM LEVEL 2

ETSM 3386- OSHA Certification

Indicator Description:

All students enrolled in the program must complete ETSM 3386 and receive their OSHA Certification in Safety. The course addresses key concepts and skills relevant to safety in the field of Engineering Technology. Each semester, all students are required to take the OSHA Certification examination as the capstone activity for the course. The certification exam is divided into multiple sections. An overall grade of 70% or higher is passing.

Criterion Description:

There is a consensus that at least 80% of the students taking the OSHA examination will make a 90 or higher on the exam, while, 100% will be certified by making a score of 70 or higher. A score of 90 or higher indicates comprehension of key concepts and elements of industrial safety management.

Findings Description:

Based on feedback from the Industrial Advisory Board (IAB) of the Industrial Safety Management minor during the Fall 2023 and Spring 2024, the curriculum plan has been updated with revisions to meet with the market needs. The revisions are completed for the 2024-2025 Catalog.

RELATED ITEM LEVEL 3

ETSM 3386- OSHA Certification

Action Description:

Continue the practice to consult with IAB members for feedback about the program and curriculum.

- Various federal, state, and local safety standards, regulations, and codes, such as OSHA 1910 general safety regulations, OSHA 1926 construction safety standards and facilities safety codes were covered in related courses.
- Students were given the opportunities to examine safety standards, regulations, and codes and then apply in industrial setting by completing term projects. An average grade of B is expected.

Develop Professional Skills

Goal Description:

Students will learn the skills necessary to compete in the professional marketplace.

Providing Department: Engineering Technology BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Professional Skills

Learning Objective Description:

Students completing the BS in Engineering Technology will gain experiential learning and field experience in the industry through an internship necessary to successfully gain employment.

RELATED ITEM LEVEL 2

ETEC 4391 Internship Evaluation

Indicator Description:

All students enrolled in the program must complete ETEC 4391 in their third or final year (Junior or Senior) of enrollment. ETEC 4391 addresses key concepts and skills, as well as practical demonstrations of competency relevant to the field of each program in the Department of Engineering Technology. Each semester interns will be evaluated by their internship supervisor and by their faculty supervisor on a faculty-developed rating scale.

Students need to meet the below student eligibility to register ETEC4391 for 3 credits or 6 credits.

1. Minimum semester hours - 32 hrs. Including 21 within the academic major for your degree program or the 15 within the academic minor for your minor program. Some internships may specify courses / content to have been completed.
2. Minimum grade of "C" or higher in ENG 1301 and 1302 or equivalent.
3. Transfer students become eligible upon the successful completion of one full-time semester if all other eligibility requirements are fulfilled and apply according to instructions on announcements.
4. Special information regarding Industrial Technology Trades and Industry Certification Program internships (ETEC 4391) - Due to the unique structure of this program, the above listed eligibility requirements do not apply. See the Trades and Industry Certification Program coordinator regarding specific requirements for this program.

The students in ETEC 4391 in Summer 2023 were evaluated by the following detail rubric:

COURSE EVALUATION – GRADING: 100 POINT SCALE

Weekly Reports [10 weekly reports]	20 Points
Summary of Syllabus	3 Points
Resume	3 Points
LinkedIn	2 Points
EMAIL Communication Skills	2 Points
ONLINE Video Review and Summary (1 video)	10 Points
FINAL SUMMARY PAPER	20 Points
FINAL SUMMARY PRESENTATION	20 Points
Supervisor's Evaluation	15 Points
Supervisor's working hour verification letter	5 Points
TOTAL	100 Points

Grade Scale - Final grades will be based upon the following points.

Your final numerical point will ROUND OFF to THE NEARNEST WHOLE NUMBER.

A = +90 Points

B = 80 – 89 Points

C = 70 – 79 Points

D = 60 – 69 Points

F = under 60 Points

Criterion Description:

It is expected that at least 85% of the students enrolled in ETEC 4391 will achieve above average standard (B or higher) of performance on the supervisor evaluation rating scale and the final letter grade. In general, if the students in ETEC 4391 miss to submit any assignments, the assignments not submitted will impact their final grades by two letter grades.

All assignments should be submitted to Blackboard by the specific due dates as below.

Assignments	Due Date
10 Weekly Reports (Weekly Logs) (6/1/2022 – 8/2/2022: 10 weeks)	By Midnight, Every Sunday i.e. The 1st Weekly Report (5/29/2023-6/2/2023) → By Midnight, 6/3/2023 (Sunday)
Summary of Syllabus	TBD
Resume	TBD
LinkedIn	TBD
ONLINE Video Review and Summary (1 Video)	TBD
EMAIL Communication Skills	No due date. (Based on your email communication between a student and an instructor)
FINAL SUMMARY PAPER	TBD
FINAL SUMMARY PRESENTATION	TBD
Supervisor's Evaluation	TBD
Supervisor's working hour verification letter	TBD

Weekly Reports are due Midnight, Every Following Sunday:

Follow and use the format as posted on Blackboard.

Don't modify the template and fill in every required information on the format.

Please describe your daily activities as specific as you can like the sample.

If your internship begins before the semester, please fill out your daily activities to the attached template and submit your weekly reports to the first week of summer semester.

For instance, if your internship begins 5/15/2023, please write 2 weekly reports from 5/15 to 5/19 and from 5/22 to 5/26 and submit 2 weekly reports with the 1st weekly report (5/29-6/2) to the folder of the 1st weekly report.

Resume:

Example will be on Blackboard – follow the example closely. Upload all your Weekly Reports to ETEC4391-1 on Blackboard before or on due date posted on Blackboard.

LinkedIn Profile:

You will develop a professional LinkedIn profile as a requirement for ETEC 4391, and you should update your profile including your current internship. And then please link your profile to Dr. Min Jae Suh and the LinkedIn page of "Sam Houston State University - Engineering Technology".

Summary of Syllabus:

This course is an online course, and the course instructor confirms that students read a course syllabus carefully or not. Students summarize key points or core contents after reading the course syllabus.

Email Communication Skills:

When you send your email properly and professionally to a course instructor. One of the purposes of this courses is to improve your professional commination skills. Additionally, the email is the best way to communicate between the instructor and the student because this is ONLINE courses. Please check your school email once a week at least!

Video Review and Summary:

An announcement/notification will be posted to ETEC4391-1 on Blackboard including the link to the video. You will watch the videos and summarize the video topics. 1-page summary should be uploaded before or on the due date to Blackboard.

Supervisor's Evaluation:

Download the Supervisor Evaluation from Blackboard. Have your immediate supervisor complete the evaluation and email it to Dr. Min Jae Suh, mjs068@shsu.edu

Supervisor's Working Hour Verification Letter:

The letter should include student's total working hours at a jobsite to verify complete student's working hours and potential future working hours to meet 300 working hours or 600 working hours. The letter should be prepared by student's supervisor or HR and include his/her signature in the letter. There is no specific format, but you can find samples for this letter.

Based on your working hour verification letter, I can confirm you can make 300 working hours or 600 working hours during your internship before or after Summer 10 Semester.

Please see the samples!

Final Summary Paper:

Submit a 2-3 page, 1.5-spaced paper. The paper should describe the history of the company in which you are interning, the job title and description for your position, the actual activities / duties / job tasks you completed while interning and your personal thoughts of the internship such as pros and cons.

Final PPT or Video Presentation:

Create a Power Point presentation that illustrates your internship experience. You will need to include pictures showing the projects / activities you performed.

Upload the presentation file to Blackboard on or before the due date.

OR

Create a 4-5 minute video that describes your experience using a self-recording.

For both of the presentations you need to identify the company, job title, skills you learned, location, travel expected, activities and/or duties you preformed, and pros and cons of your internship. Also include examples of the classes you have taken that supported your experience and skills you think should be included or added to the courses of your major.

Findings Description:

There were 68 Engineering Technology students enrolled in ETEC4391-01 and/or 02 in Summer 2023. The number of students in ETEC4391-01 and/or 02 was increased by one student. Most students successfully completed this course in Summer 2023. The summary of our findings in relation to the learning objectives is shown in the below table.

Summarized Students' Course Achievements

Directly supported learning objectives and student outcomes:	-Students completing the BS in Engineering Technology will demonstrate skills necessary to compete in the professional marketplace through an internship. 1.Work in an Industrial Environment. 2.Work in either a Field Management, a Construction Management, a Superintendent Management, Project Management, Safety Management, or combinations of responsibilities. 3.Exhibit characteristics associated with successful employment in industry.
	-Students will establish a professionalism to be ready to start their successful careers in each professional field through an internship. 4. Develop the required reports and maintain progressive reviews that identify the progress being made on the project. 5. Supervise workers in the various trades that are under their responsibilities. 6. Write change orders on specification sheets. 7. Prepare project documents and resources to support the activities for a project.
	-Students will improve their written, oral, and graphical communication skills with stakeholders in each professional field to maintain professional working relationships. 8.Communicate with subcontractors and maintain professional working relationships 9.Write and maintain punch list and other required documentation.

Student's internship supervisors submitted their supervisor's evaluations with their evaluation rating scale and observations to a course instructor, and the evaluation rating was determined by immediate student's internship supervisor using 5 rating scale from A to F and it was based on the performance of internship student at their jobsite during their internship program. 93% of internship students received 'A' from their internship supervisors and 6% of internship students received 'B'. Therefore, 99% of students in this course achieved A or B from their internship supervisor at their internship employers. Only one student out of 68 students could not receive student's supervisor's evaluation from a supervisor. The percent in Summer 2023 was almost the same as Summer 2022 and the percent was higher than the target percentile of ETEC4391-1 and/or 2 in summer 2023.

99% of students completed the course in Summer 2023 and 91% of students successfully received above average final letter grades, A or B, at the end of semester. The summary of the distribution of final letter grade is as follows: 91% of students in ETEC4391-01 and/or 02 students achieved above the average final letter grade, and the percentile is higher than the target of criterion, at least 85% of the students enrolled in ETEC 4391 will achieve above average standard ('B' or higher). 4% of students achieved 'C', 3% of students achieved 'D', and 1% of students could not pass this course in Summer 2023. Overall, the percentile of students who received above average standard (B or higher) was almost similar with Summer 2022.

RELATED ITEM LEVEL 3

ETEC 4391 Internship Evaluation

Action Description:

Continue to utilize internships and other opportunities such as service projects to develop professional industrial skills. To improve of this course, a course instructor considers student's professionalism at their workplaces and work ethics. That is the reason why the instructor wants to see their communication skills and weekly logs as one of assignments. Also, the instructor wants to see their professional writing skills and presentation skills through weekly logs, final presentation, and final reports. The instructor tries to develop online supervisor's evaluation form to provide more convenience to student's supervisors and improve the efficiency to integrate supervisor's feedbacks for our students

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The faculty in the program will continue to address the observations regarding the needs to add a dedicated course to the existing curriculum addressing construction law and recruitment of additional full-time faculty with the increasing students majoring in this program.

Update of Progress to the Previous Cycle's PCI:

The faculty in the Department of Engineering Technology will continue to assess the learning objectives of development and demonstration of professional skills to ensure that all Engineering Technology students will be ready to successfully start their careers in a professional industrial environment. We will continuously academically and practically support our Engineering Technology students to meet or exceed our target percentile, 85% above average rating (B or higher) of performance on the supervisor’s evaluation and final letter grade during Internship

New Plan for Continuous Improvement Item

Closing Summary:

The faculty in the program will continue to address the observations regarding the needs to add a dedicated course to the existing curriculum addressing construction law and recruitment of additional full-time faculty with the increasing students majoring in this program.

Mechanical Engineering Technology BS

Demonstrate Effective Professional Communication Skills

Goal Description:

Students will develop effective professional communication skills through course activities such as written reports, team projects, oral presentations, and graphical documents.

Providing Department: Mechanical Engineering Technology BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Effective Professional Communication Skills

Learning Objective Description:

Students will develop theoretical knowledge and practical skills relevant to mechanical engineering technology, including stress and strain, deformation, and experimental tests for structural elements such as beams. Students will be able to:

- Analysis structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain, and elastic behavior of materials
- Analysis of stresses, strains, deflection, and deformation in bodies under the action of loads
- Understanding bending and shearing stresses in beams, stress and shear flow formulas, combined stresses and Mohr's circle, torsion on a circular shaft
- Perform lab experiments that relate to stresses and strain in different structures

RELATED ITEM LEVEL 2

Demonstrate Effective Professional Communication Skills

Indicator Description:

- ETEC 4376 is required for students enrolled in the Mechanical Engineering Technology program. This course addresses the strength of materials subjected to various mechanical loads with applications to the analysis of structural elements such as beams
- Students are expected to achieve a 70 or higher on a scale of 100 and standard in which 90% ≤ A, 80% ≤ B < 90%, 70% ≤ C < 80%, 60% ≤ D < 70%, F < 60%
- The overall grade for the ETEC 4376 Strength of Materials course is broken down as follows: Exam 1 and Exam 2 are 15% each, Final Exam is 20%, Homework assignments are 20%, and Laboratory is 30%

Criterion Description:

Homework assignments

The more in-depth assignments are given to students to practice more in different topics and to learn working on their own.

Midterm Exam

Students are assigned exam problems related to the first part of the course material.

Final exam

Students are assigned exam problems that conclude all the course material taught in class.

Lab experiments

Students perform different experiments to understand the concepts taught in class and they submit a lab report after each experiment.

Findings Description:

ETEC 4376 Strength of Materials is a senior-level course, and it was offered in Fall 2021, Fall 2022, and Fall 2023. Since the Mechanical Engineering Technology BS is a new program (started in the Fall of 2020), only two transferred students enrolled in this course in the Fall of 2021, eight students in the Fall of 2022, and 22 students in Fall 2023. In this course, I taught the students different topics such as stress concepts (normal and shear stresses), stress and strain, torsion, pure bending, analysis and design of beams for bending, shear stresses in beams, the transformation of stress and strain, principal stresses under given loading, and deflection of beams. We had a lab part of this course where the students performed the experiments by themselves in the lab. The concepts taught in class are explained more in the lab experiments. The students are asked to write lab reports for each experiment they have in the lab.

Twenty-two students enrolled in ETEC4376 in Fall 2023, and their performance is as follows:
Exams: first, second, and final exams (combined):

grade A -3
grade B - 7
grade C - 3
grade D - 3
grade F - 6

Class and homework assignments

grade A - 9
grade B - 5
grade C - 5
grade D - 1
grade F - 2

Lab activities
grade A - 14
grade B - 3
grade C - 1
grade D - 2
grade F - 2

These assessments show that the students performed well in hands-on activities in comparison with theoretical assessments such as exams.

RELATED ITEM LEVEL 3

Action - Communication Skills

Action Description:

It seems the students do better in the hands-on activities and classwork and homework assignments compared to in-class exams. More labs will be added to the set of experiments that we perform in the lab and more class and homework assignments, too.

Demonstrate Knowledge and Skills

Goal Description:

Students will develop theoretical knowledge and practical skills relevant to mechanical engineering technology, such as mechanical design, analysis, prototyping, and testing

Providing Department: Mechanical Engineering Technology BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Knowledge and Skills

Learning Objective Description:

Students will develop theoretical knowledge and practical skills relevant to mechanical engineering technology, including free body diagram, force and moment definitions, analysis of forces on a rigid body, and a couple due to moment of a force. Students receive both lecture-based training and hands-on experience designing and constructing a model bridge from scratch by applying their knowledge on the abovementioned items. Students will be able to

- examine qualitative and quantitative treatments of forces and moments
- design trusses, construct free-body diagrams, and perform equilibrium analysis for coplanar systems.
- apply force analysis extended to beams, brackets, springs, and other commonly seen structural elements in the industry.
- work collaboratively in a team to develop, test, and optimize mechanical systems such as a truss bridge

RELATED ITEM LEVEL 2

Demonstrate Knowledge and Skills

Indicator Description:

- ETEC 3375 Statics is required for students enrolled in the Mechanical Engineering Technology program. This course addresses key concepts and skills relevant to force system analysis with application to static force analysis for mechanical systems such as a bridge
- Students are expected to achieve a 70 or higher on a scale of 100 and standard in which <60 = fail, 60 ~69 = meet minimum expectations, 70~79 = satisfied, 80~89 = good, >=90 excellent. It is expected that 80% of the students evaluated will score 70 or higher
- The overall grade for the ETEC 3375 Statics course is broken down as below.
  60% – Homework Assignments (including one bonus for extra credit), 20 % – midterm exam, and 20 % - final exam
- The homework assignments are evaluated through Blackboard LMS. The midterm and final exams are evaluated through in-person handwritten exams.

Criterion Description:

Class notes

The instructor will lecture in the class and demonstrate the solving procedure of problems. Students are highly encouraged to make the notes and must show them to the instructor during office hours. The instructor will verify your engagement in the course and will provide feedback.

Class Assignments

Occasionally, the instructor will give class assignments that are counted towards the 10% extra credit. This is to encourage class participation and there will be no retakes and due date extensions for any type of absences.

Midterm and Final Exam

The final exam will be comprehensive and based on the end chapter problems of chapters 2-4. It will consist of 9 questions from which the student has to answer any 4. There are no multiple retakes for this exam.

Findings Description:

The course provided students with the opportunity to apply their math skills and force estimation techniques to solve engineering statics problems. There were 24 students enrolled in the course in Spring 2024, and their performance on various indicators is evaluated and given below.

Homework

grade A - 18
grade B - 4
grade C - 1
grade D - 0
grade F - 1

Midterm and Final Exams

grade A - 12
grade B - 6
grade C - 5
grade D - 0
grade F - 1

Overall Final Grade

grade A - 14
grade B - 9
grade C - 0
grade D - 0
grade F - 1

This assessment shows that the students were performing well for both homework and exams.

RELATED ITEM LEVEL 3

Action - Knowledge and Skills
Action Description:
More emphasis was given to building the foundations of students' necessary mathematical skills, specifically vector and vector analysis. This was proven effective in the student's performance on exams and homework. This trend will continue.

New Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

Faculty in the BS in Mechanical Engineering Technology plan to continue the effort to examine and revise the program curriculum, course offering rotation plan, and pre-requisite sequence to better serve the growing students. The faculty will further develop and improve the existing labs and other related resources as well. With students graduating from the program, faculty will also discuss the plan to apply for the accreditation of the program by the Accreditation Board for Engineering and Technology (ABET).

Update of Progress to the Previous Cycle's PCI:

During this assessment cycle, two new courses, ETME3320 Mechatronics and ETME 4380 Applied FEM Analysis, were proposed. They are currently being reviewed by the COSET curriculum committee. One tenure-track assistant professor left the program for another university in Fall 2023. With the rapid growth of the program (currently ~180 majors), two new tenure-track assistant professors will join the program in Fall 2024.

New Plan for Continuous Improvement Item

Closing Summary:

With the addition of faculty (A total of four tenure-track/tenured) and students starting to graduate (~10 graduates during the 2023-2024 academic year), the team plans to start the process of preparing the program for ABET accreditation in Fall 2024.

Department of Environmental and Geosciences

Environmental Studies Minor

Goal 1: Train Environmental Studies students to have knowledge of the physical environment from a social science perspective

Goal Description:

Environmental Studies students will learn basic skills and competencies relevant to the social, cultural and geographic implications of environmental issues

Providing Department: Environmental Studies Minor

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Objective 1a: Proficiency with Concepts Related to Socio-Economic Dimensions of Environmental Issues

Learning Objective Description:

Students will demonstrate proficiency with concepts pertaining to socio-economic dimensions of the environment

RELATED ITEM LEVEL 2

Concepts Related to Socio-Economic Dimensions of Environmental Issues (Objective 1a)

Indicator Description:

Questions pertaining to social and economic dimensions of the environment will be embedded in exams for courses in the minor

Criterion Description:

The average score will be 70% on questions pertaining to social and economic dimensions of the environment

Findings Description:

Students enrolled in GEOG 1300 scored 59% on questions pertaining to social and economic dimensions of the environment. The scores for GEOG 3350 were at 68%, which was on par with the overall exam grades. Scores for both courses increased slightly from the previous cycle. The scores on such questions incorporated in GEOG 3301 scored 68% on such questions, which represents a slight decrease from 2022-2023. Scores for GEOG 3301 were also equivalent to those realized with overall exam grades. No scores for GEOG 4356 could be reported, as this class was not offered during the review cycle.

RELATED ITEM LEVEL 3

Action - Concepts Related to Socio-Economic & Geographic Dimensions of Environmental Issues (Objectives 1a & 1b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area. It is quite possible that student learning is either more or less enhanced if other pertinent courses were considered. GEOG 4331 (Conservation) & GEOG 4351 (Economic Geography) focus specific and direct attention on social and socio-economic issues. Going forward these two courses will be included within the assessment program.

RELATED ITEM LEVEL 1

Objective 1b: Proficiency with Concepts Related to Geographic Dimensions of Environmental Issues

RELATED ITEM LEVEL 2

Concepts Related to Geographic Dimensions of Environmental Issues (Objective 1b)

Indicator Description:

Questions pertaining to geographic dimensions of environmental issues will be embedded in exams for courses in the minor

Criterion Description:

The average score will be 70% on questions pertaining to geographic dimensions of environmental issues

Findings Description:

Students enrolled in GEOG 1300 scored 59% on questions pertaining to geographic dimensions of the environment. The scores for GEOG 3301 were at 65%, which was on par with the overall exam grades. The scores on such questions incorporated in GEOG scored 69% on such questions. In all cases (GEOG 1300, 3301 and 3350), scores were equivalent to those realized with overall exam grades. The scores for 1300 and 3350 represent a slight increase from the previous year, while those for 3301 were slightly lower.

RELATED ITEM LEVEL 3

Action - Concepts Related to Socio-Economic & Geographic Dimensions of Environmental Issues (Objectives 1a & 1b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area. It is quite possible that student learning is either more or less enhanced if other pertinent courses were considered. GEOG 4331 (Conservation) & GEOG 4351 (Economic Geography) focus specific and direct attention on social and socio-economic issues. Going forward these two courses will be included within the assessment program.

Goal 2: Train students to approach environmental problems and challenges from diverse perspectives

Goal Description:

Environmental Studies students will learn basic skills and competencies relevant to political and economic implications of environmental issues

Providing Department: Environmental Studies Minor

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Objective 2a: Proficiency with Concepts Related to Economic Dimensions of Environmental Issues

Learning Objective Description:

Students will demonstrate proficiency with concepts pertaining to economic dimensions of the environment

RELATED ITEM LEVEL 2

Concepts Related to Economic Dimensions of Environmental Issues (Objective 2a)

Indicator Description:

Questions pertaining to economic dimensions of environmental issues will be embedded in exams for courses in the minor

Criterion Description:

The average score will be 70% on questions pertaining to economic dimensions of environmental issues

Findings Description:

Students enrolled in GEOG 1300 scored 57% on questions pertaining to economic dimensions of the environment issues. The scores for GEOG 3301 were at 69%, while those for GEOG 3350 were 67%. For all three classes, the scores were slightly lower than was the case for the overall exam grades, but did represented increases from the previous year. No scores were available for GEOG 4356, as the course was not offered this past year.

RELATED ITEM LEVEL 3

Action - Concepts Related to Economic Dimensions of Environmental Issues, and policy issues (Objectives 2a & 2b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area.GEOG 4331 (Conservation) & GEOG 4351(Economic Geography) focus specific attention on social and economic issues. These courses also provide explicit treatment of issues pertaining to environmental policy. Going forward these two courses will be included within the assessment program.

RELATED ITEM LEVEL 1

Objective 2b: Proficiency with Concepts Related to Dimensions of Environmental Policy

Learning Objective Description:

Students will demonstrate proficiency with concepts pertaining to dimensions of environmental policy

RELATED ITEM LEVEL 2

Concepts Related to Dimensions of Environmental Policy (Objective 2b)

Indicator Description:

Questions pertaining to environmental policy will be embedded in exams for courses in the minor

Criterion Description:

The average score will be 70% on questions pertaining to environmental policy

Findings Description:

Students enrolled in GEOG 1300 scored 63% on questions pertaining to environmental policy, which was on par for overall exam grades. The scores for GEOG 3301 were at 70%, also on par with the overall exam grades. The scores for these two courses represent an increase from the previous year. The scores on such questions incorporated in GEOG 3350 scored 66% on such questions, also equivalent to those realized with overall exam grades. There was no way to temporally compare the results for 3350, as these types of questions had not before been included in the assessment mechanism. No results could be reported for GEOG 4356, as the class was not offered this past year.

RELATED ITEM LEVEL 3

Action - Concepts Related to Economic Dimensions of Environmental Issues, and policy issues (Objectives 2a & 2b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area.GEOG 4331 (Conservation) & GEOG 4351(Economic Geography) focus specific attention on social and economic issues. These courses also provide explicit treatment of issues pertaining to environmental policy. Going forward these two courses will be included within the assessment program.

Goal 3: Train students to have a strong foundation in systems thinking

Goal Description:

Students will be able to link physical systems and human/cultural systems, as well as possess sufficient knowledge of human-environment interaction

Providing Department: Environmental Studies Minor

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Performance Objective 3a: Proficiency with Introductory Concepts in Human-Environment Relationships

Performance Objective Description:

Students will demonstrate proficiency with introductory concepts pertaining to human-environment relationships

RELATED ITEM LEVEL 2

Embedded questions in exams pertaining to Introductory Concepts in Human-Environmental Interaction

KPI Description:

Questions pertaining to introductory concepts in human-environmental interaction will be embedded in exams for courses in the minor

Target Description:

The average score will be 70% on questions pertaining to introductory concepts of human-environment interaction

Results Description:

Students enrolled in both GEOG 1300 scored 64% on embedded questions pertaining to human-environment interaction and the nature of environmental systems. In the case of GEOG 1300, this was a significant increase from the previous assessment. The scores were still lower than hoped, yet are basically equivalent to the overall scores for exams in the two courses. The scores on such questions incorporated in GEOG 3301 were slightly higher than the previous year. Students enrolled in this courses scored 66%, which was noticeably lower than overall exam scores. Scores in GEOG 3350 were slightly lower than the previous year - 70%, compared to 71%.. No results could be compared for GEOG 4356, as the course was not offered this past year.

Not data were derived from the variety of other advanced courses courses, primarily because this assessment was due before data could be derived. Moreover, this minor program is still too new to have any students matriculate through these courses.

RELATED ITEM LEVEL 3

Action - Embedded questions in exams pertaining to Introductory & Advanced Concepts in Human-Environmental Interaction (Objectives 3a & 3b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area.GEOG 4331 (Conservation), GEOG 4351 (Economic Geography) and GEOG 4356 (Urban Geography), as well as other field courses, focus specific attention on issues pertaining to human-environmental interaction. Going forward these two courses will be included within the assessment program.

RELATED ITEM LEVEL 1

Performance Objective 3b: Students will demonstrate proficiency with advanced concepts pertaining to human-environment relationships

Performance Objective Description:

Students will demonstrate proficiency with advanced concepts pertaining to human-environment relationships

RELATED ITEM LEVEL 2

Embedded questions in exams pertaining to Advanced Concepts in Human-Environmental Interaction (Objective 3b)

KPI Description:

Questions pertaining to advanced concepts in human-environmental interaction will be embedded in exams for courses in the minor

Target Description:

The average score will be 70% on questions pertaining to advanced concepts of human-environment interaction

Results Description:

Students enrolled in GEOG 1300 scored 57% on embedded questions pertaining to more advanced concepts in human-environment interaction and the nature of environmental systems. This was a slight increase from the previous assessment, and on part with scores realized across the overall exams. The scores on such questions incorporated in GEOG 3301 were slightly lower than the previous year. Students enrolled scored 67% on such questions. Strangely, student enrolled in this class (GEOG 3301) continued to score higher on advanced concepts in the subject area than they did on introductory concepts. As was the case with introductory concepts, students enrolled in GEOG 3350 scored 69% on advanced concepts in this subject area. This was slightly higher than the previous year and a bit lower than that realized with overall exam grades. No data could could be provided for GEOG 4356, as this course was not offered this past year.

Not data could be derived from the variety of other advanced courses, primarily because the results were due before results could get derived. Moreover, the minor program is still relatively new and not students have matriculated through these courses.

RELATED ITEM LEVEL 3

Action - Embedded questions in exams pertaining to Introductory & Advanced Concepts in Human-Environmental Interaction (Objectives 3a & 3b)

Action Description:

The Environmental Studies program is still somewhat new, thus many students have not yet been enrolled in many of the advanced courses. Moreover, the assessment mechanism formulated for this program is still developing. For example, student performance within three courses (1300, 3301, 3350) suggest that students learning is increasing, yet we still yet to assess performance in other courses critical to this subject area.GEOG 4331 (Conservation), GEOG 4351 (Economic Geography) and GEOG 4356 (Urban Geography), as well as other field courses, focus specific attention on issues pertaining to human-environmental interaction. Going forward these two courses will be included within the assessment program.

New Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

Going forward, future assessments of the environmental studies program will focus on two areas. The first emphasis will be to ensure that all critical dimensions of this interdisciplinary minor program are being assessed - i.e. we need to judge what subject areas (environmental policy, economic aspects of environmental issues, social dimensions of environmental problems, etc.) need the most improvement. This need will met by assessing a broader array of courses.

The second area of concern is a possible disconnect between the different courses that comprise the program (this is purely based on anecdotal conversions that has yet to be supported by any real evidence). Given the interdisciplinary nature of the program, the environmental studies minor is comprised of courses from multiple program areas. There is some concern that student failure to recognize linkages between the subject areas may be due to the fact that the different courses may be less linked to one another than they should be. In the future, concerted efforts will be made to enhance collective communication among various departments involved with the operation of the minor.

Update of Progress to the Previous Cycle's PCI:

Additional courses were incorporated in the assessment of this program this year, compared to the limited number of courses incorporated in 2022-2-23. However, two courses that cover critical subject matter have yet to be included (GEOG 4331 & 4351). One other relevant course was not offered this past year (GEOG 4356; Urban Geography). Going forward, future assessments of the environmental studies program will include these additional courses.

The second area of concern identified last year was potential disconnects between the different courses that comprise the program. We did engage in discussions of how some courses are linked to one another, yet a comprehensive program evaluation has not been completed. This program-wide review is scheduled for this upcoming year.

New Plan for Continuous Improvement Item

Closing Summary:

Moving ahead, future evaluations of the environmental studies minor program will concentrate on two key focuses. The first priority will be to verify that all critical facets of this interdisciplinary program are being appropriately assessed - specifically, we need to identify which subject domains (such as environmental policy, economic implications of environmental issues, societal dimensions of environmental problems, etc.) require the most improvement. This will be accomplished by assessing a more comprehensive range of courses.

The second area of emphasis relates to potential disconnects between the various courses that constitute the program (though this is presently just anecdotal and lacks substantive evidence). Given the interdisciplinary nature of the minor, it comprises courses from multiple disciplinary areas. There is some concern that students may fail to recognize the linkages across these subject areas, possibly due to insufficient integration among the different courses. Future efforts will thus aim to enhance collective communication and coordination among the various departments involved in delivering the minor program.

Geographic Information Systems MS

Goal 1: Prioritize Student Success by delivering a curriculum with appropriate discipline specific knowledge

Goal Description:

One of the primary objectives of the GIS graduate program is to provide appropriate knowledge and technical skills to students so that students are able to develop and demonstrate knowledge of geospatial principles as well as computational and technical skills to enable them to be successful in the geospatial workforce within Texas and beyond.

Students will learn the appropriate advanced Applied GIS and remote sensing knowledge and skills.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
2. All graduate students will demonstrate the ability to communicate knowledge of advanced applied GIS and geospatial principles.
3. All graduate students will have the knowledge and skills to apply/utilize the most advanced geospatial techniques
4. Students will acquire knowledge and skill sets that will make them competitive in the ever evolving geospatial job market within the state and beyond.

RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

All graduate students will demonstrate a mastery of applied GIS principles and applications through a written graduate comprehensive examination, administered by a committee of three graduate GIS faculty members. The examination will consist of questions about the theory, concepts and applied principles of Geographic Information Systems, Science and Remote Sensing techniques to real world problems and issues. A committee of graduate faculty members who offer graduate courses in the subject areas will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area. The comprehensive exam will evaluate student's understanding of the material covered in all the graduate classes.

Criterion Description:

Each student must earn at least a "Pass" mark in each examined area to pass the written comprehensive exams. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

Three students took their comprehensive exam in fall 2023. The comprehensive examination committee consisting of the two faculty members who offer graduate GIS classes, and the interim graduate coordinator. A third faculty member who did teach graduate courses had resigned and did not provide questions. Questions for the comprehensive examination were drafted by the student's comprehensive examination committee members. Off the three students who took their exam in fall 2022, one students earned a grade of High Pass in at least one section. All the students earned an overall grade of Pass.

Four more students took their comprehensive exam in spring 2024. Out of the four students, one student earned a grade of High Pass in two sections. All the other students earned a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

We will continue to offer advanced GIS courses that enhance the marketability of our graduate students in the GIS job industry. Based on feedback received from industry experts, we have begun incorporating updated and modern GIS applications. All courses going forward will utilize the latest available version of ArcGIS Pro. These up-to-date applications are now required for students to be competitive in the job market. We will also offer new applied courses, such as Environmental Applications of Python Programming and GIS & Urban and Regional Planning. Additionally, we will continue to review plans for upgrading to the next generation of Remote Sensing software.

We will continuously evaluate how these changes impact student degree plans and their progress. The effects of these changes will be more readily assessed in the next few years.

We are also evaluating the future format of new graduate course offerings. In recent years, our program has offered course options for students requiring and preferring face-to-face instruction, as well as courses for students enrolled in a fully online professional track. However, given the recent growth in demand for undergraduate GIS courses and the increase in our international student population, offering a fully online degree is no longer sustainable. We will be pausing the acceptance of students into the fully online degree until we can re-evaluate and reassess are available human resources.

GIS is an applied field; therefore, we must ensure that our hardware and software are up-to-date and using the most current versions. To achieve this, the graduate program heavily relies on support from SHSU IT. We will also hire a full-time GIS Lab Technician starting Fall 2024, who

will assist with the technical support required across the program.

RELATED ITEM LEVEL 1

Acquire the most up to date geospatial infrastructure for graduate students to be workforce ready

Performance Objective Description:

The graduate program will make all efforts to acquire and install the latest geospatial infrastructure so that we are able to provide our graduate students with the knowledge and training that prepares them in every way for the job market or pursue a doctoral degree. This will support the graduate program's goal to prioritize graduate student success, embody a culture of excellence within the graduate program and train students to be ready for the job market who contribute to the economy, and thereby elevate our service to the State and beyond.

RELATED ITEM LEVEL 2

Comprehensive exams

KPI Description:

Students are required to take a comprehensive exam which will evaluate their mastery of geospatial principles and applications. Students must successfully pass the exam in order to graduate with a Master's degree. The comprehensive exam will also examine their readiness in using the most updated geospatial platform to ensure they are prepared for the competitive workforce and enhance the reputation of our graduate program.

Target Description:

At least 80% of graduate students taking their comprehensive exam will pass their exam on their first attempt. 100% will pass on their second attempt.

Results Description:

Three graduate students took their comprehensive exam in fall 2023 and four more took their comprehensive exam in spring 2024. In fall we had one student who had earned a grade of High Pass in one section and all the other students passed the comprehensive exam in their first attempt with a grade of Pass. In spring, one student earned a grade of High Pass and all the other students passed the comprehensive exam in their first attempt with a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

Goal 2: Prioritize Student success by upgrading to ArcGIS Enterprise as the licensing mechanism and user management system for GIS graduate classes

Goal Description:

In order to ensure that students who graduate with a Master's degree in GIS are competitive in the job market the next primary goal of the graduate program is to impart curriculum utilizing the most updated GIS technology that includes ArcGIS Pro and ArcGIS Online, part of ArcGIS Enterprise. Most employers in the state expect students with a master's degree in GIS to have expertise in these application platforms.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
2. All graduate students will demonstrate the ability to communicate knowledge of advanced applied GIS and geospatial principles.
3. All graduate students will have the knowledge and skills to apply/utilize the most advanced geospatial techniques
4. Students will acquire knowledge and skill sets that will make them competitive in the ever evolving geospatial job market within the state and beyond.

RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

All graduate students will demonstrate a mastery of applied GIS principles and applications through a written graduate comprehensive examination, administered by a committee of three graduate GIS faculty members. The examination will consist of questions about the theory, concepts and applied principles of Geographic Information Systems, Science and Remote Sensing techniques to real world problems and issues. A committee of graduate faculty members who offer graduate courses in the subject areas will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area. The comprehensive exam will evaluate student's understanding of the material covered in all the graduate classes.

Criterion Description:

Each student must earn at least a "Pass" mark in each examined area to pass the written comprehensive exams. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

Three students took their comprehensive exam in fall 2023. The comprehensive examination committee consisting of the two faculty members who offer graduate GIS classes, and the interim graduate coordinator. A third faculty member who did teach graduate courses had resigned and did not provide questions. Questions for the comprehensive examination were drafted by the student's comprehensive examination committee members. Off the three students who took their exam in fall 2022, one students earned a grade of High Pass in at least one section. All the students earned an overall grade of Pass.

Four more students took their comprehensive exam in spring 2024. Out of the four students, one student earned a grade of High Pass in two sections. All the other students earned a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

We will continue to offer advanced GIS courses that enhance the marketability of our graduate students in the GIS job industry. Based on feedback received from industry experts, we have begun incorporating updated and modern GIS applications. All courses going forward will utilize the latest available version of ArcGIS Pro. These up-to-date applications are now required for students to be competitive in the job market. We will also offer new applied courses, such as Environmental Applications of Python Programming and GIS & Urban and Regional Planning. Additionally, we will continue to review plans for upgrading to the next generation of Remote Sensing software.

We will continuously evaluate how these changes impact student degree plans and their progress. The effects of these changes will be more readily assessed in the next few years.

We are also evaluating the future format of new graduate course offerings. In recent years, our program has offered course options for students requiring and preferring face-to-face instruction, as well as courses for students enrolled in a fully online professional track. However, given the recent growth in demand for undergraduate GIS courses and the increase in our international student population, offering a fully online degree is no longer sustainable. We will be pausing the acceptance of students into the fully online degree until we can re-evaluate and reassess are available human resources.

GIS is an applied field; therefore, we must ensure that our hardware and software are up-to-date and using the most current versions. To achieve this, the graduate program heavily relies on support from SHSU IT. We will also hire a full-time GIS Lab Technician starting Fall 2024, who will assist with the technical support required across the program.

RELATED ITEM LEVEL 1

Acquire the most up to date geospatial infrastructure for graduate students to be workforce ready

Performance Objective Description:

The graduate program will make all efforts to acquire and install the latest geospatial infrastructure so that we are able to provide our graduate students with the knowledge and training that prepares them in every way for the job market or pursue a doctoral degree. This will support the graduate program's goal

to prioritize graduate student success, embody a culture of excellence within the graduate program and train students to be ready for the job market who contribute to the economy, and thereby elevate our service to the State and beyond.

RELATED ITEM LEVEL 2

Comprehensive exams

KPI Description:

Students are required to take a comprehensive exam which will evaluate their mastery of geospatial principles and applications. Students must successfully pass the exam in order to graduate with a Master's degree. The comprehensive exam will also examine their readiness in using the most updated geospatial platform to ensure they are prepared for the competitive workforce and enhance the reputation of our graduate program.

Target Description:

At least 80% of graduate students taking their comprehensive exam will pass their exam on their first attempt. 100% will pass on their second attempt.

Results Description:

Three graduate students took their comprehensive exam in fall 2023 and four more took their comprehensive exam in spring 2024. In fall we had one student who had earned a grade of High Pass in one section and all the other students passed the comprehensive exam in their first attempt with a grade of Pass. In spring, one student earned a grade of High Pass and all the other students passed the comprehensive exam in their first attempt with a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

Goal 3: Embody a culture of excellence by recruiting efforts for the graduate program

Goal Description:

The program will continue efforts to recruit quality students for the graduate program to embody a culture of excellence within the graduate program. The graduate program will reach out for assistance from the University for those efforts.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
2. All graduate students will demonstrate the ability to communicate knowledge of advanced applied GIS and geospatial principles.
3. All graduate students will have the knowledge and skills to apply/utilize the most advanced geospatial techniques
4. Students will acquire knowledge and skill sets that will make them competitive in the ever evolving geospatial job market within the state and beyond.

RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

All graduate students will demonstrate a mastery of applied GIS principles and applications through a written graduate comprehensive examination, administered by a committee of three graduate GIS faculty members. The examination will consist of questions about the theory, concepts and applied principles of Geographic Information Systems, Science and Remote Sensing techniques to real world problems and issues. A committee of graduate faculty members who offer graduate courses in the subject areas will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area. The comprehensive exam will evaluate student's understanding of the material covered in all the graduate classes.

Criterion Description:

Each student must earn at least a "Pass" mark in each examined area to pass the written comprehensive exams. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

Three students took their comprehensive exam in fall 2023. The comprehensive examination committee consisting of the two faculty members who offer graduate GIS classes, and the interim graduate coordinator. A third faculty member who did teach graduate courses had resigned and did not provide questions. Questions for the comprehensive examination were drafted by the student's comprehensive examination committee members. Off the three students who took their exam in fall 2022, one students earned a grade of High Pass in at least one section. All the students earned an overall grade of Pass.

Four more students took their comprehensive exam in spring 2024. Out of the four students, one student earned a grade of High Pass in two sections. All the other students earned a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS.

However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

We will continue to offer advanced GIS courses that enhance the marketability of our graduate students in the GIS job industry. Based on feedback received from industry experts, we have begun incorporating updated and modern GIS applications. All courses going forward will utilize the latest available version of ArcGIS Pro. These up-to-date applications are now required for students to be competitive in the job market. We will also offer new applied courses, such as Environmental Applications of Python Programming and GIS & Urban and Regional Planning. Additionally, we will continue to review plans for upgrading to the next generation of Remote Sensing software.

We will continuously evaluate how these changes impact student degree plans and their progress. The effects of these changes will be more readily assessed in the next few years.

We are also evaluating the future format of new graduate course offerings. In recent years, our program has offered course options for students requiring and preferring face-to-face instruction, as well as courses for students enrolled in a fully online professional track. However, given the recent growth in demand for undergraduate GIS courses and the increase in our international student population, offering a fully online degree is no longer sustainable. We will be pausing the acceptance of students into the fully online degree until we can re-evaluate and reassess are available human resources.

GIS is an applied field; therefore, we must ensure that our hardware and software are up-to-date and using the most current versions. To achieve this, the graduate program heavily relies on support from SHSU IT. We will also hire a full-time GIS Lab Technician starting Fall 2024, who will assist with the technical support required across the program.

RELATED ITEM LEVEL 1

Recruit quality graduate students to embody a culture of excellence within the graduate program

Performance Objective Description:

The graduate program will continue all efforts to recruit quality students who join the GIS graduate program and work with faculty members on research projects to embody a culture of excellence within the graduate program.

RELATED ITEM LEVEL 2

Comprehensive exams

KPI Description:

Students are required to take a comprehensive exam which will evaluate their mastery of geospatial principles and applications. Students must successfully pass the exam in order to graduate with a Master's degree. The comprehensive exam will also examine their readiness in using the most updated geospatial platform to ensure they are prepared for the competitive workforce and enhance the reputation of our graduate program.

Target Description:

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RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

Goal 4: Embody a culture of excellence and conduct research and publish to bring greater visibility to the GIS graduate program.

Goal Description:

An important component of graduate teaching is research and publication. We will continue with our efforts to conduct research and publish in well respected peer reviewed journals and focus on involving graduate students in research activities.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
2. All graduate students will demonstrate the ability to communicate knowledge of advanced applied GIS and geospatial principles.
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RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

All graduate students will demonstrate a mastery of applied GIS principles and applications through a written graduate comprehensive examination, administered by a committee of three graduate GIS faculty members. The examination will consist of questions about the theory, concepts and applied principles of Geographic Information Systems, Science and Remote Sensing techniques to real world problems and issues. A committee of graduate faculty members who offer graduate courses in the subject areas will evaluate students' performance and give a mark of Fail, Pass, or High Pass in each examined area. The comprehensive exam will evaluate student's understanding of the material covered in all the graduate classes.

Criterion Description:

Each student must earn at least a "Pass" mark in each examined area to pass the written comprehensive exams. Each student is allowed two attempts. Faculty expect that at least 80% of graduate students will pass their exam on their first attempt. 100% will pass on their second attempt.

Findings Description:

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Four more students took their comprehensive exam in spring 2024. Out of the four students, one student earned a grade of High Pass in two sections. All the other students earned a grade of Pass.

RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

We will continue to offer advanced GIS courses that enhance the marketability of our graduate students in the GIS job industry. Based on feedback received from industry experts, we have begun incorporating updated and modern GIS applications. All courses going forward will utilize

the latest available version of ArcGIS Pro. These up-to-date applications are now required for students to be competitive in the job market. We will also offer new applied courses, such as Environmental Applications of Python Programming and GIS & Urban and Regional Planning. Additionally, we will continue to review plans for upgrading to the next generation of Remote Sensing software.

We will continuously evaluate how these changes impact student degree plans and their progress. The effects of these changes will be more readily assessed in the next few years.

We are also evaluating the future format of new graduate course offerings. In recent years, our program has offered course options for students requiring and preferring face-to-face instruction, as well as courses for students enrolled in a fully online professional track. However, given the recent growth in demand for undergraduate GIS courses and the increase in our international student population, offering a fully online degree is no longer sustainable. We will be pausing the acceptance of students into the fully online degree until we can re-evaluate and reassess are available human resources.

GIS is an applied field; therefore, we must ensure that our hardware and software are up-to-date and using the most current versions. To achieve this, the graduate program heavily relies on support from SHSU IT. We will also hire a full-time GIS Lab Technician starting Fall 2024, who will assist with the technical support required across the program.

Goal 5: Train graduate students who will expand and elevate our service to the State and beyond

Goal Description:

An important goal of the GIS graduate program is to train students who are well prepared for a competitive job market and contribute positively to the State and beyond. This will also enhance their upward social mobility.

Providing Department: Geographic Information Systems MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Learning Objective: Demonstrate a thorough understanding of the principles and applications of geospatial techniques and theories

Learning Objective Description:

1. The GIS graduate program will train students in the knowledge and application of geospatial skills who will contribute to SHSU's priorities to expand and elevate the University's service to the State and beyond.
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4. Students will acquire knowledge and skill sets that will make them competitive in the ever evolving geospatial job market within the state and beyond.

RELATED ITEM LEVEL 2

Mastery Of Advanced Applied GIS Knowledge - Written Comprehensive Exams

Indicator Description:

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RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

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We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

RELATED ITEM LEVEL 3

Mastery Of Advanced Applied GIS Knowledge

Action Description:

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Environmental Applications of Python Programming and GIS & Urban and Regional Planning. Additionally, we will continue to review plans for upgrading to the next generation of Remote Sensing software.

We will continuously evaluate how these changes impact student degree plans and their progress. The effects of these changes will be more readily assessed in the next few years.

We are also evaluating the future format of new graduate course offerings. In recent years, our program has offered course options for students requiring and preferring face-to-face instruction, as well as courses for students enrolled in a fully online professional track. However, given the recent growth in demand for undergraduate GIS courses and the increase in our international student population, offering a fully online degree is no longer sustainable. We will be pausing the acceptance of students into the fully online degree until we can re-evaluate and reassess are available human resources.

GIS is an applied field; therefore, we must ensure that our hardware and software are up-to-date and using the most current versions. To achieve this, the graduate program heavily relies on support from SHSU IT. We will also hire a full-time GIS Lab Technician starting Fall 2024, who will assist with the technical support required across the program.

RELATED ITEM LEVEL 1

Acquire the most up to date geospatial infrastructure for graduate students to be workforce ready

Performance Objective Description:

The graduate program will make all efforts to acquire and install the latest geospatial infrastructure so that we are able to provide our graduate students with the knowledge and training that prepares them in every way for the job market or pursue a doctoral degree. This will support the graduate program's goal to prioritize graduate student success, embody a culture of excellence within the graduate program and train students to be ready for the job market who contribute to the economy, and thereby elevate our service to the State and beyond.

RELATED ITEM LEVEL 2

Comprehensive exams

KPI Description:

Students are required to take a comprehensive exam which will evaluate their mastery of geospatial principles and applications. Students must successfully pass the exam in order to graduate with a Master's degree. The comprehensive exam will also examine their readiness in using the most updated geospatial platform to ensure they are prepared for the competitive workforce and enhance the reputation of our graduate program.

Target Description:

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Results Description:

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RELATED ITEM LEVEL 3

Comprehensive Exam

Action Description:

We will continue to evaluate student progress in the graduate program based on an intensive comprehensive exam. As indicated by results of the comprehensive exams our graduate students have been exposed to a variety of theoretical and practical concepts and principles in GIS. However, results of this assessment, combined with conversations with alumni and potential employers, has led to the conclusion that our the graduate program is due for a re-evaluation. Employment in the GIS industry now requires additional technical skills and experience with a more diverse array of applications. Coincidentally, two additional GIS faculty have been hired who will be offering graduate GIS courses. In short, we will be redeveloping and upgrading our program and its course offerings.

We will continue with the format for the comprehensive exam. We will also look at the results of the comprehensive exam to evaluate which areas we need to develop better methods.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

As last year we will continue efforts to be able to offer courses that use latest version of GIS software. The GIS industry has upgraded to a new GIS software, ArcGIS Pro and the use of cloud based solution, ArcGIS Online for Organizations. We will continue reviewing efforts to offers courses that use ArcGIS pro instead of ArcGIS desktop and ArcGIS Online instead of ArcGIS Server. All employers expect students with a Master's degree in GIS to be familiar with these two GIS platforms as indicated by reviews submitted by employers where we had GIS graduate students either engaged in an internship or a fulltime job. Upgrading to an ArcGIS Enterprise as the licensing mechanism and user management system is a rather large endeavor and will require the department to work closely with SHSU IT for campus wide installation. We will work very closely with the IT department to overcome the technical hurdles faced when offering such courses on campus. We have started preliminary conversations with IT. Currently, a faculty member also performs the role of a GIS software administrator. In order to provide our graduate students instruction using the latest technology we have to upgrade the technology. We will evaluate plans to bring on-board a GIS software administrator atleast on a part-time basis.

We are also looking at including drone technology and data processing captured by means of drone into our graduate course offerings. The department has acquired a high quality drone that will be incorporated into graduate teaching. Moreover, we have a new faculty member joining the department in fall 2023. The faculty member specializes in remote sensing and we are looking forward to offering new graduate course/s in their area of specialization.

Currently all our graduate students have been successful in procuring an internship or a full time job opportunity by the time they are in their second year of the program. Students who were working fulltime when they joined the graduate program have progressed in their career by the time they graduate from the Master's program. As per reviews submitted by employers where GIS graduate students were engaged in an internship opportunity or working fulltime, employers are very pleased with the technical and conceptual competence of our graduate students.

We will also continue to evaluate student progress by administering a comprehensive exam typically taken during the third semester and by using final projects in all GIS graduate courses. The comprehensive exams are a very useful tool in examining student learning in the graduate program. Students are given either a High Pass, Pass or Fail. Students who fail the exam must re-take the exam in their next semester. Most of the students have passed the exam with a grade of Pass. Very few students earn a grade of High Pass. We will continue to monitor students who earn a grade of Fail and also examine the underlying reasons.

Another tool used to evaluate student learning are projects. All graduate students must work on final projects in every graduate course. Students work individually on these projects to demonstrate their understanding of the course material and their ability to apply that material in a real-world scenario. Final projects are a key component of a student's final grade.

The number of international students who were able to join the program has taken a hit due to the pandemic. The graduate program in collaboration with the Office of International Programs and Graduate Admissions will continue to work towards strategies that make it easier for good quality international students to join the program after they are accepted.

An important component of graduate teaching is research and publication. We will continue with our efforts to conduct research and publish in peer reviewed journals. Such activities bring visibility to the program, department, College and the University.

Update of Progress to the Previous Cycle's PCI:

During this latest assessment period, the department collaborated with SHSU IT to implement the latest version of ArcGIS Pro software. While the process was not entirely smooth, this updated software was ultimately fully integrated into all GIS courses. We no longer rely on a faculty member to serve as the GIS software administrator, as a full-time staff member was hired to fulfill these duties.

A new faculty member with expertise in drone technology joined the department in Fall 2023. They will begin incorporating high-quality drone technology into graduate-level teaching in Fall 2024. We expect the use of this technology to become more fully integrated across both the undergraduate and graduate programs going forward.

Our graduate students continue to successfully pursue and secure internship and full-time employment opportunities as they complete the program or near degree completion.

We continued to utilize the comprehensive exam as a means to assess student learning. Once again, our students successfully completed this exam to a high degree. We will also continue to evaluate student success and monitor students who earn a failing grade, examining the underlying reasons.

Recognizing that experience with research projects is a critical component of a graduate degree, we decided to offer a new course focusing specifically on Project Formation. Students enrolled in this course will spend the entire semester working on all steps required for completing a GIS project (research formulation, data access, data management, analysis, etc.).

Now that travel restrictions have been relaxed, we have begun receiving an increased number of applications from international students. The graduate program, in conjunction with COSET, has continued to collaborate with the Office of International Programs and Graduate Admissions to develop strategies that facilitate the enrollment of high-quality international students after their acceptance.

Plan for Continuous Improvement Item

Closing Summary:

The graduate program is undergoing redevelopment and reformulation. This process was partially driven by the continued need to update the curriculum and associated software applications. It was also driven by changes in personnel. In recent years, two faculty members devoted to the graduate program resigned. One of these faculty members was responsible for nearly half of the course offerings and also served as the program coordinator. We have since replaced both faculty lines, and the program is being managed by an interim graduate coordinator. Given these changes, there will be a need for the development of several new courses and new initiatives when it comes to program management, marketing, advising, and student recruitment. The program assessment will also be adjusted going forward.

Consistent with previous years, we will continue efforts to offer updated and relevant courses that utilize the latest version of GIS software. ArcGIS Pro will be fully implemented across the program, as will the latest remote sensing software and drone technology. We will continue reviewing efforts to ensure that software and hardware needs are identified and met. A newly hired GIS Software Administrator will now be available to assist with technological needs and troubleshooting.

A new emphasis will be placed on student mentoring and advising. In the past, all graduate students were advised by the graduate coordinator. Beginning in Fall 2024, graduate student advising will be a collective effort among the GIS faculty, with each faculty member being assigned a small number of graduate students. More collaborative efforts will also be used for all aspects of the program, such as recruitment, application review, marketing, and assessment.

There has been a significant increase in the demand for undergraduate GIS skills. For example, the department now operates two separate interdisciplinary programs that are at least somewhat focused on the application of geospatial technology (crime mapping, in collaboration with criminal justice, and precision agriculture). Accordingly, more of the department's focus is needed to meet this demand. We have decided that meeting the demand for a fully online (100%) professional master's degree is simply not sustainable at this time, at least not without compromising the undergraduate needs across campus. We will continue to serve graduate students currently enrolled in the professional track but will pause the acceptance of new students into this fully online program.

The Applied GIS Graduate program is scheduled to undergo external review in 2024-25. We fully expect that this review will provide an opportunity to formulate the best program we can offer to meet the needs of our students, the university, the region, and the state.

Geography BA

GOAL 2: Train students to have a strong foundation in Human Geography

Goal Description:

Students will be able to fully comprehend and apply concepts from their human/cultural geography courses

Providing Department: Geography BA

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Human Geography Concepts (Supports Goal 2b)

Learning Objective Description:

Students will demonstrate proficiency with advanced concepts pertaining to human geography.

RELATED ITEM LEVEL 2

Advanced Human Geography Concepts

Indicator Description:

Questions pertaining to advanced concepts of human geography will be embedded in advanced geography courses (GEOG 1300, 3350, & 4360)

Criterion Description:

The average score will be 70% on questions pertaining to advanced human geography

Findings Description:

Students enrolled in GEOG 1300 averaged averaged 68% on a series of specific questions embedded in exams that pertained to advanced concepts in human geography. Students enrolled in GEOG 3350 (cultural geography) averaged 72% on a separate series of questions. Students enrolled in GEOG 4360 (cultural field students scored 77% on questions pertaining to this area. The scores for 1300 & 4360 increased slightly from the previous year's assessment, while those from 3350 decreased slightly. No data was available from GEOG 4356 because the course was not taught this past year.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Human Geography Concepts (Supports Goal 2a)

Learning Objective Description:

Students will demonstrate proficiency with basic introductory concepts pertaining to human geography, concepts that serve as the foundation/prerequisite for upper-level coursework in this subfield.

RELATED ITEM LEVEL 2

Introductory Human Geography Concepts

Indicator Description:

Questions pertaining to introductory human geography concepts will be embedded in exams for introductory geography courses (GEOG 1300, 3350)

Criterion Description:

The average score will be 70% on questions pertaining to introductory human geography

Findings Description:

Students enrolled in GEOG 1300 (people, place & environment) on average scored 67% on questions pertaining to introductory human geography. This is slightly higher than the assessment from the previous year. Students enrolled in GEOG 3350 (cultural geography) scored 75% on such questions, which represents a slight increase from the previous year.

RELATED ITEM LEVEL 3

ACTION to enhance Introductory Human Geography Concepts (supports 2a)

Action Description:

Previous efforts to enhance the teaching of introductory Human Geography concepts seemed to work. Results suggest this stems from increased course sequencing (taking courses in an effective order) and incorporation of active learning (subjects that utilized this approach seemed to be more well understood). The geography faculty will be undergoing a complete curriculum evaluation in 2024-25. Results from this assessment will serve as the basis for this evaluation. Active learning activities will also be incorporated in additional courses.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

GOAL 4: Train students to have a strong foundation in systems thinking

Goal Description:

Students will be able to link physical systems and human/cultural systems, as well as possess sufficient knowledge of human-environment interaction

Providing Department: Geography BA

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Concepts in Human-Environment Relationships (Supports Goal 4b)
Learning Objective Description:
Students will demonstrate proficiency with advanced concepts pertaining to human-environment relationships

RELATED ITEM LEVEL 2

Advanced Concepts of Human-Environment Interaction
Indicator Description:
Questions pertaining to advanced concepts of human-environment interaction will be embedded in exams for relevant upper-level geography courses (GEOG 3301, 3350 & 4360)

Criterion Description:
The average score will be 70% on questions pertaining to advanced concepts of advanced human-environment interaction

Findings Description:
Students enrolled in GEOG 3301 (Environmental Geography) scored on average 71% on a series of embedded questions pertaining to advanced concepts of human-environmental interaction. Students enrolled in GEOG 3350 (Cultural Geography) scored on average 67% a separate series of embedded questions pertaining to such advanced concepts. These results from both courses were notably lower than were realized in this area during the previous assessment cycle. Students enrolled in GEOG 4360 (Cultural Field Studies) were assessed for knowledge of these concepts, but were assessed via a much smaller set of questions. These students (in 4360) scored 76% on such questions. This was the first time students from this course were assessed for this particular area.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction
Action Description:
Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Concepts in Human-Environment Relationships (Supports Goal 4a)
Learning Objective Description:
Students will demonstrate proficiency with introductory concepts pertaining to the relationships between human and environmental systems, concepts that will serve as the foundation and pre-requisites for advanced course-work in the sub-field

RELATED ITEM LEVEL 2

Introductory Concepts of Human-Environment Interaction

Indicator Description:

Questions pertaining to introductory concepts of human-environment interaction will be embedded in exams for introductory geography courses (GEOG 1300, 1401, 3301, 3350 & 4360)

Criterion Description:

The average score will be 70% on questions pertaining to introductory concepts of human-environment interaction

Findings Description:

Students enrolled in GEOG 1300 scored on average 67% on embedded questions pertaining to introductory concepts of human environmental interaction. Students enrolled in GEOG 1401 scored on average 66% on such questions. The results for these introductory courses were slightly higher than those realized from the previous assessment cycle.

Students enrolled in advanced geography courses (GEOG 3301. 3350 & 4360) were also assessed for this area. Students enrolled in GEOG 3301 (Environmental Geography) scored on average 71% on a series of embedded questions pertaining to advanced concepts of human-environmental interaction. Students enrolled in GEOG 3350 (Cultural Geography) scored on average 67% a separate series of embedded questions pertaining to such advanced concepts. Unlike the case with the introductory courses, these results from these two advanced courses were notably lower than were realized in this area during the previous assessment cycle. Students enrolled in GEOG 4360 (Cultural Field Studies) were assessed for knowledge of these concepts, but were assessed via a much smaller set of questions. These students (in 4360) scored 76% on such questions. This was the first time students from this course were assessed for this particular area.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

GOAL 5: Maintain an effective geographical curricula and strong interconnections and linkages across the curricula

Goal Description:

The Geography coordinator and an Assessment Committee will continually gage the degree to which all assessment goals are being met

Providing Department: Geography BA

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Assessment Committee Coordination (Supports Goal 5b)

Performance Objective Description:

The Geography coordinator will convene meetings with an Assessment Committee comprised of representatives of the various subfields (Human Geography, Environmental/Physical Geography, and Geo-techniques) to discuss curricula outcomes and potential need for changes

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings

KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Target Description:

The committee will be formed by members of three subject areas (human geography, environmental geography, and geospatial technology). Meetings will focus on developing a plan of action of how to better assess these three subject areas, and how to address weaknesses identified through these assessments.

Results Description:

The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment (BS)

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings

KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Results Description:

The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the

assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 2

Student Satisfaction Survey (supports Performance Objectives 5a and 5b)

KPI Description:

Students will be given a survey their last semester prior to graduation to give feedback on any program issues and on their experiences negotiating the geography programs, including scheduling, course offerings, course content, and overall satisfaction.

Results Description:

A small sample of graduating seniors from the geography program were surveyed. The results suggest a need to better coordinate the courses across the curriculum - students noted that some of the courses operated independently of one another, without any clear linkages or step-wise progression from one course to another. All students survey identified that this was particularly true in regards to the geospatial courses that comprise the program. Students also identified the potential utility of completing a course focused on statistical applications specific to their field of study (geography). One strength recognized by the surveyed students was the perceived benefit of being advised within the department (by geography faculty), as opposed to needing to rely on the SAM Center. For example, students expressed appreciation for the fact that geography faculty were able to recommend elective courses (and internship opportunities) outside the department that aligned well with their academic foci and career goals.

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 1

Assessment Committee Coordination (Supports Goal 5b)

Performance Objective Description:

The Geography coordinator will convene meetings with an Assessment Committee comprised of representatives of the various subfields (Human Geography, Environmental/Physical Geography, and Geo-techniques) to discuss curricula outcomes and potential need for changes

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings

KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Results Description:

The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 2

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Results Description:

A small sample of graduating seniors from the geography program were surveyed. The results suggest a need to better coordinate the courses across the curriculum - students noted that some of the courses operated independently of one another, without any clear linkages or step-wise progression from one course to another. All students survey identified that this was particularly true in regards to the geospatial courses that comprise the program. Students also identified the potential utility of completing a course focused on statistical applications specific to their field of study (geography). One strength recognized by the surveyed students was the perceived benefit of being advised within the department (by geography faculty), as opposed to needing to rely on the SAM Center. For example, students expressed appreciation for the fact that geography faculty were able to recommend elective courses (and internship opportunities) outside the department that aligned well with their academic foci and career goals.

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 1

Coordination and Interconnections Across Geographic Sub-fields (Supports Goal 5a)
Performance Objective Description:

The Geography Coordinator, in consultation with assessment committee, will continually gage the degree to which the various components of the geography curricula are effectively operating

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings
KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Results Description:

The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)
Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 2

Student Satisfaction Survey (supports Performance Objectives 5a and 5b)
KPI Description:

Students will be given a survey their last semester prior to graduation to give feedback on any program issues and on their experiences negotiating the geography programs, including scheduling, course offerings, course content, and overall satisfaction.

Results Description:

A small sample of graduating seniors from the geography program were surveyed. The results suggest a need to better coordinate the courses across the curriculum - students noted that some of the courses operated independently of one another, without any clear linkages or step-wise

progression from one course to another. All students survey identified that this was particularly true in regards to the geospatial courses that comprise the program. Students also identified the potential utility of completing a course focused on statistical applications specific to their field of study (geography). One strength recognized by the surveyed students was the perceived benefit of being advised within the department (by geography faculty), as opposed to needing to rely on the SAM Center. For example, students expressed appreciation for the fact that geography faculty were able to recommend elective courses (and internship opportunities) outside the department that aligned well with their academic foci and career goals.

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

Goal 1. Train students to have a strong foundation in core Geography concepts

Goal Description:

Geography students will learn basic skills and competencies relevant to a well-rounded geographic education

Providing Department: Geography BA

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with First-Year Foundational Concepts (Supports Goal 1a)

Learning Objective Description:

Students will demonstrate proficiency in First-Year Foundational Geographic Concepts

RELATED ITEM LEVEL 2

Foundational Concepts (Supports Learning Obj. 1a)

Indicator Description:

Questions pertaining to the use of introductory concepts were embedded in exams for geography courses (GEOG 1300, 1401, 3301, & 3350)

Criterion Description:

The average score will be 70% on questions pertaining to introductory geography concepts

Findings Description:

Students enrolled in GEOG 1300 averaged 64% in on a series of questions embedded in exams that pertained to introductory concepts in geography. Those enrolled in GEOG 1401 averaged 60% on similar questions. Students enrolled in 3350 & 3301 scored 71% and 72%, respectively, on questions pertaining to introductory concepts. The results from all four courses (1300, 1401, 3301 & 3350) were all lower than what were realized from the previous assessment. No data was available from GEOG 4356 since the course was not offered.

RELATED ITEM LEVEL 3

Action to improve Foundational Concepts (Supports Foundational Concepts Learning Obj. 1a)

Action Description:

This indicator would support previous identified weaknesses with student outcomes: notable inabilities to work with maps, graphs & the interpretation of basic statistical data. Results from this assessment suggest that student learning in these areas in more efficient in smaller classes/labs. Accordingly, we will increasingly focus on these subject matter in lab sections (per GEOG 1401), and in breakout focus groups in courses that do not incorporate distinct lab components. Basic map skills will also be incorporated in geotechnical courses (all majors are now required to complete GEOG 2464).

RELATED ITEM LEVEL 1

Proficiency with Global and Geographical Awareness (Supports Goal 1b)

Learning Objective Description:

Students will demonstrate a proficient level of global and geographic awareness

RELATED ITEM LEVEL 2

The world in spatial terms (Supports Learning Objective 1b)

Indicator Description:

Questions pertaining to concepts demonstrating comprehension of the world in spatial terms will be embedded in geography courses (GEOG 1300, 1401 and 3350)

Criterion Description:

The average score will be 70% on questions embedded in exams and quizzes pertaining to the world in spatial terms

Findings Description:

Students enrolled in GEOG 1300 scored 57% on questions pertaining to knowing the world in spatial terms, while students enrolled in 1401 scored 59%. Students enrolled in GEOG 3350 performed much better on such questions, scoring 75% on such questions. These scores are lower than what were realized during the last assessment cycle. Students enrolled in GEOG 2355 & 2356 were not assessed due to the timing of the assessment.

RELATED ITEM LEVEL 3

Action to address the World in spatial terms (Supports Learning Objective 1b)

Action Description:

Results suggest that students still lack basic knowledge of the world – including geographical locations of significant places & events, as well as the relative connections between different places from a global perspective. One challenge with the assessment is that this cycle only a certain number of courses were incorporated. These courses that were able to be assessed were systematic courses – i.e. courses whose primary purpose was to address specific topics/concepts (culture, environment). Future assessments will also incorporate courses designed to focus specifically on regional perspectives (GEOG 2355 & 2356)

Goal 3. Train Students to Have a Strong Foundation in Environmental/Physical Geography

Goal Description:

Students will be able to fully comprehend and apply concepts from their environmental/physical geography courses

Providing Department: Geography BA

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Environmental/Physical Geography Concepts (Supports Goal 3b)
Learning Objective Description:
Students will demonstrate proficiency with advanced concepts pertaining to environmental and physical geography

RELATED ITEM LEVEL 2

Advanced concepts in Environmental/Physical Geography
Indicator Description:
Questions pertaining to advanced concepts in Environmental/Physical Geography will be embedded in exams for upper-level courses in the sub-field (GEOG 1300, 1401, 3301 & 3350)

Criterion Description:
The average score will be 70% on questions pertaining to advanced environmental/physical geography

Findings Description:
Students enrolled in GEOG 1300 scored on average 66% on embedded questions pertaining to advanced environmental/physical geography. Students enrolled in GEOG 1401 scored 64% on such questions. The averages for both courses (1300 & 1401) increased from the previous year. Meanwhile, students enrolled in GEOG 3301 and 3350 scored 74% and 74%, respectively, on separate sets of questions that pertained to the introductory concepts related to environmental/physical geography. The average scores for both 3301 & 3350 both increased slightly from the previous year. It is notable that students in all four courses scores higher on questions pertaining to advanced concepts than was the case with introductory concepts. This most likely relates to the fact that advanced concepts were tested or assessed towards the final stages of the courses.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction
Action Description:
Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Concepts in Environmental/Physical Geography (Supports Goal 3a)
Learning Objective Description:

Students will demonstrate proficiency with basic introductory concepts pertaining to physical and environmental geography, concepts that serve as the foundation/pre-requisites for upper-level coursework in this sub-field

RELATED ITEM LEVEL 2

Introductory Concepts in Environmental/Physical Geography

Indicator Description:

Questions pertaining to introductory concepts of environmental/physical geography will be embedded in exams for introductory geography courses (GEOG 1300, 1401, 2341, 2355, and 2356)

Criterion Description:

The average score will be 70% on questions pertaining to introductory concepts in Environmental/Physical Geography

Findings Description:

Students enrolled in GEOG 1300 scored on average 61% on embedded questions pertaining to introductory environmental/physical geography. Students enrolled in GEOG 1401 scored 58% on such questions. The averages for both courses (1300 & 1401) decreased from the previous year. Meanwhile, students enrolled in GEOG 3301 and 3350 scored 74% and 73%, respectively, on separate sets of questions that pertained to the introductory concepts related to environmental/physical geography. The average scores for both 3301 & 3350 both increased slightly from the previous year.

RELATED ITEM LEVEL 3

Acting on Assessment (BS)

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 2

Introductory Concepts in Environmental/Physical Geography

Indicator Description:

Questions pertaining to introductory environmental/physical geography concepts will be embedded in exams for introductory geography courses (GEOG 1300, 1401, 3301 & 3350).

Criterion Description:

The average score will be 70% on questions pertaining to introductory environmental/physical geography

Findings Description:

Students enrolled in GEOG 1300 scored on average 61% on embedded questions pertaining to introductory environmental/physical geography. Students enrolled in GEOG 1401 scored 58% on such questions. The averages for both courses (1300 & 1401) decreased from the previous year. Meanwhile, students enrolled in GEOG 3301 and 3350 scored 74% and 73%, respectively, on separate sets of questions that pertained to the introductory concepts related to environmental/physical geography. The average scores for both 3301 & 3350 both increased slightly from the previous year.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

Going forward our plan to improve our program, and the assessment of it, will focus on four initiatives. 1) We will formulate and implement the operation of sub-committees that will focus on the assessment of specific foci with the curricula (Environmental/Physical geography, human geography, and geospatial techniques). This will lead to a more inclusive assessment mechanism and should enable us to better organize the natural progression of skills and content subject matter from one class to another. The framework for these sub-committees are already in place.

2) Incorporate more geospatial technique courses (Intro to GIS, Applied GIS, Computer Cartography, remote sensing, etc.) into our assessment program. Anecdotally, one of the criticisms of our geospatial program from graduating students has been a lack of coherency from one course to another (at times course content is overlapped, in other ways there is no natural progression of expectations from one course to another - the courses do not build upon one another as well as they should). Future assessments will endeavor to collective determine what skills should be emphasized in each course, therefore allowing for a more coherent curriculum. This will allow us to better assess how effective these courses are at actually teaching students these skills.

3) Continue teaching important statistical skills, as well as skills with the use and interpretation of maps/charts/tables, in smaller, more intimate environments – labs, break-out sections in lectures, etc. Our efforts at doing this very thing have proven successful at enhancing student learning. Accordingly, we will build on these efforts going forward.

4) Continue to include supplementary material (videos, short videos, etc.) in on-line labs, as well as encourage students enrolled in online sections to take advantage of opportunities to virtually communicate with lab TAs and faculty. We will also continue to experiment with better ways to teach critical skills in the online environment.

Update of Progress to the Previous Cycle's PCI:

We implemented portions of our previous improvement plan, but faced challenges due to personnel changes. One faculty member fully resigned, another resigned for an administrative role mid-cycle, and a third served as faculty senate president with significant administrative duties. All three taught geospatial applications courses, severely limiting our ability to increase assessment in that area. Additionally, the faculty member responsible for coordinating the entire assessment plan underwent major surgery during a critical period.

Regarding our four identified initiatives:

1. Subcommittees: Some met to address previous weaknesses and will continue meeting, incorporating more courses into assessment efforts.
2. Incorporating geospatial technique courses (Intro to GIS, Applied GIS, Cartography, Remote Sensing, etc.): We could not fully meet goals due to the personnel issues mentioned. Many courses relied on adjuncts. A new committee has convened to determine emphasized skills for each course to improve future assessment.
3. Teaching statistical skills and map/chart/table interpretation in smaller settings: Our efforts again successfully enhanced learning, though a proposed statistics course specific to geosciences has not yet been created (planned for 2024-25).
4. Supplementary materials in online labs: We continued using videos/materials which proved beneficial. We will expand use of supplements in online and face-to-face courses, building on successes and modifying less effective approaches.

New Plan for Continuous Improvement Item

Closing Summary:

The results of this past assessment seems to suggest that the key to increased student success (or least the key to mitigating challenges that are broad in nature and somewhat out of our control) continues to lie in three areas: 1) teaching certain key concepts (particularly foundational concepts) in smaller, more intimate settings, preferably in face-to-face settings, or via the provision of supplementary material pertaining to such concepts when delivered online; 2) offering courses (or units within pre-existing courses) that more directly focus on critical concepts (especially the basic interpretation of statistical data and maps) and 3) continuing to integrate ours courses into a cohesively linked curricula.

Obviously, there will continue to be a demand to have larger class-sizes, as well as online courses. We plan on coping with this reality by determining key concepts that require critical focus, then trying to incorporate them within lab sections (which by nature are smaller in size). A few faculty have been incorporating active learning techniques (dividing large lecture classes into groups to go over certain key concepts - thus, providing intimate environments, and fostering student-

involved learning). We plan to encourage all faculty to use these techniques to a larger degree. Short videos focused on key concepts will be used in some online sections, really the only option in that form of learning environment.

We have yet to fully incorporate some of geotechnique courses into our assessment plan (at least not as fully as other courses). We will be increasingly incorporating these courses into our assessment program. Some of these courses will also play an increased role in offering students experience with basic mapping principles (an identified weakness). Efforts to do this very thing this last year was hampered by the sudden resignation of a critical faculty member teaching in this area. Her position was replaced this past year and a new faculty hire will enable us to re-initiate this agenda. The results from this assessment, and previous assessments, will also be used to inform decision-making when it comes to course offerings developed by the new faculty member scheduled to join the department in Fall 2024.

We will be reforming sub-committees to focus on assessment areas (human geography, environment/physical geography, and geotechnology). These will make efforts to ensure that more courses, and more subject matter, are incorporated into our assessment efforts. This should allow us to get a better picture of how well we are doing in terms of meeting our curriculum goals.

Geography BS

GOAL 2 (BS): Train students to have a strong foundation in Human Geography

Goal Description:

Students will be able to fully comprehend and apply concepts from their human/cultural geography courses

Providing Department: Geography BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Human Geography Concepts (Supports Goal 2b)

Learning Objective Description:

Students will demonstrate proficiency with advanced concepts pertaining to human geography

RELATED ITEM LEVEL 2

Advanced Human Geography Concepts

Indicator Description:

Questions pertaining to advanced concepts of human geography will be embedded in advanced geography courses (GEOG 3310, 3350, 3352, 3359, 4351, 4356, and 4357)

Criterion Description:

The average score will be 70% on questions pertaining to advanced human geography

Findings Description:

Students enrolled in GEOG 1300 averaged averaged 68% on a series of specific questions embedded in exams that pertained to advanced concepts in human geography. Students enrolled in GEOG 3350 (cultural geography) averaged 72% on a separate series of questions. Students enrolled in GEOG 4360 (cultural field students scored 77% on questions pertaining to this area. The scores for 1300 & 4360 increased slightly from the previous year's assessment, while those from 3350 decreased slightly. No data was available from GEOG 4356 because the course was not taught this past year.

RELATED ITEM LEVEL 3

Acting on Assessment (BS)

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed

in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Human Geography Concepts (Supports Goal 2a)

Learning Objective Description:

Students will demonstrate proficiency with basic introductory concepts pertaining to human geography, concepts that serve as the foundation/pre-requisite for upper-level coursework in the sub-field

RELATED ITEM LEVEL 2

Introductory Human Geography Concepts

Indicator Description:

Questions pertaining to introductory human geography concepts will be embedded in exams for introductory geography courses (GEOG 1300, 3350)

Criterion Description:

The average score will be 70% on questions pertaining to introductory human geography

Findings Description:

Students enrolled in GEOG 1300 (people, place & environment) on average scored 67% on questions pertaining to introductory human geography. This is slightly higher than the assessment from the previous year. Students enrolled in GEOG 3350 (cultural geography) scored 75% on such questions, which represents a slight increase from the previous year.

RELATED ITEM LEVEL 3

ACTION to enhance Introductory Human Geography Concepts (supports 2a)

Action Description:

Previous efforts to enhance the teaching of introductory Human Geography concepts seemed to work. Results suggest this stems from increased course sequencing (taking courses in an effective order) and incorporation of active learning (subjects that utilized this approach seemed to be more well understood). The geography faculty will be undergoing a complete curriculum evaluation in 2024-25. Results from this assessment will serve as the basis for this evaluation. Active learning activities will also be incorporated in additional courses.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

Goal 1 (BS). Train students to have a strong foundation in core Geography concepts

Goal Description:

Geography students will learn basic skills and competencies relevant to a well-rounded geographic education

Providing Department: Geography BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with First-Year Foundational Concepts (Supports Goal 1a)

Learning Objective Description:

Students will demonstrate proficiency in First-Year Foundational Geographic Concepts

RELATED ITEM LEVEL 2

Foundational Concepts (Supports Learning Obj. 1a)

Indicator Description:

Questions pertaining to the use of introductory concepts were embedded in exams for geography courses (GEOG 1300, 1401, 3301, & 3350)

Criterion Description:

The average score will be 70% on questions pertaining to introductory geography concepts

Findings Description:

Students enrolled in GEOG 1300 averaged 64% in on a series of questions embedded in exams that pertained to introductory concepts in geography. Those enrolled in GEOG 1401 averaged 60% on similar questions. Students enrolled in 3350 & 3301 scored 71% and 72%, respectively, on questions pertaining to introductory concepts. The results from all four courses (1300, 1401, 3301 & 3350) were all lower than what were realized from the previous assessment. No data was available from GEOG 4356 since the course was not offered.

RELATED ITEM LEVEL 3

Action to improve Foundational Concepts (Supports Foundational Concepts Learning Obj. 1a)

Action Description:

This indicator would support previous identified weaknesses with student outcomes: notable inabilities to work with maps, graphs & the interpretation of basic statistical data. Results from this assessment suggest that student learning in these areas in more efficient in smaller classes/labs. Accordingly, we will increasingly focus on these subject matter in lab sections (per GEOG 1401), and in breakout focus groups in courses that do not incorporate distinct lab components. Basic map skills will also be incorporated in geotechnical courses (all majors are now required to complete GEOG 2464).

RELATED ITEM LEVEL 1

Proficiency with Global and Geographical Awareness (Supports Goal 1b)

Learning Objective Description:

Students will demonstrate a proficient level of global and geographic awareness

RELATED ITEM LEVEL 2

The world in spatial terms (Supports Learning Objective 1b)

Indicator Description:

Questions pertaining to concepts demonstrating comprehension of the world in spatial terms will be embedded in geography courses (GEOG 1300, 1401 and 3350)

Criterion Description:

The average score will be 70% on questions embedded in exams and quizzes pertaining to the world in spatial terms

Findings Description:

Students enrolled in GEOG 1300 scored 57% on questions pertaining to knowing the world in spatial terms, while students enrolled in 1401 scored 59%. Students enrolled in GEOG 3350 performed much better on such questions, scoring 75% on such questions. These scores are lower than what were realized during the last assessment cycle. Students enrolled in GEOG 2355 & 2356 were not assessed due to the timing of the assessment.

RELATED ITEM LEVEL 3

Action to address the World in spatial terms (Supports Learning Objective 1b)

Action Description:

Results suggest that students still lack basic knowledge of the world – including geographical locations of significant places & events, as well as the relative connections between different places from a global perspective. One challenge with the assessment is that this cycle only a certain number of courses were incorporated. These courses that were able to be assessed were systematic courses – i.e. courses whose primary purpose was to address specific topics/concepts (culture, environment). Future assessments will also incorporate courses designed to focus specifically on regional perspectives (GEOG 2355 & 2356)

Goal 3 (BS). Train Students to Have a Strong Foundation in Environmental/Physical Geography

Goal Description:

Students will be able to fully comprehend and apply concepts from their environmental/geography courses

Providing Department: Geography BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Environmental/Physical Geography Concepts (Supports Goal 3b)

Learning Objective Description:

Students will demonstrate proficiency with advanced concepts pertaining to environmental and physical geography

RELATED ITEM LEVEL 2

Advanced concepts in Environmental/Physical Geography

Indicator Description:

Questions pertaining to advanced concepts in Environmental/Physical Geography will be embedded in exams for upper-level courses in the sub-field (GEOG 1300, 1401, 3301 & 3350)

Criterion Description:

The average score will be 70% on questions pertaining to advanced environmental/physical geography

Findings Description:

Students enrolled in GEOG 1300 scored on average 66% on embedded questions pertaining to advanced environmental/physical geography. Students enrolled in GEOG 1401 scored 64% on such questions. The averages for both courses (1300 & 1401) increased from the previous year. Meanwhile, students enrolled in GEOG 3301 and 3350 scored 74% and 74%, respectively, on separate sets of questions that pertained to the introductory concepts related to environmental/physical geography. The average scores for both 3301 & 3350 both increased slightly from the previous year. It is notable that students in all four courses scores higher on questions pertaining to advanced concepts than was the case with introductory concepts. This most likely relates to the fact that advanced concepts were tested or assessed towards the final stages of the courses.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Concepts in Environmental/Physical Geography (Supports Goal 3a)

Learning Objective Description:

Students will demonstrate proficiency with basic introductory concepts pertaining to physical and environmental geography, concepts that serve as the foundation/pre-requisites for upper-level coursework in this sub-field

RELATED ITEM LEVEL 2

Introductory Concepts in Environmental/Physical Geography

Indicator Description:

Questions pertaining to introductory environmental/physical geography concepts will be embedded in exams for introductory geography courses (GEOG 1300, 1401, 3301 & 3350).

Criterion Description:

The average score will be 70% on questions pertaining to introductory environmental/physical geography

Findings Description:

Students enrolled in GEOG 1300 scored on average 61% on embedded questions pertaining to introductory environmental/physical geography. Students enrolled in GEOG 1401 scored 58% on such questions. The averages for both courses (1300 & 1401) decreased from the previous year. Meanwhile, students enrolled in GEOG 3301 and 3350 scored 74% and 73%, respectively, on

separate sets of questions that pertained to the introductory concepts related to environmental/physical geography. The average scores for both 3301 & 3350 both increased slightly from the previous year.

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory & Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

Goal 4 (BS): Train Students to have a strong foundation in systems thinking

Goal Description:

Students will be able to link physical systems and human/cultural systems, as well as possess sufficient knowledge of human-environment interaction

Providing Department: Geography BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Proficiency with Advanced Concepts in Human-Environment Relationships (Goal 4b)

Learning Objective Description:

Students will demonstrate proficiency with advanced concepts pertaining to human-environment relationships

RELATED ITEM LEVEL 2

Advanced Concepts of Human-Environment Interaction

Indicator Description:

Questions pertaining to advanced concepts of human-environment interaction will be embedded in exams for relevant upper-level geography courses

Criterion Description:

The average score will be 70% on questions pertaining to advanced concepts of advanced human-environment interaction

Findings Description:

Students enrolled in GEOG 3301 (Environmental Geography) scored on average 71% on a series of embedded questions pertaining to advanced concepts of human-environmental interaction. Students enrolled in GEOG 3350 (Cultural Geography) scored on average 67% a separate series of embedded questions pertaining to such advanced concepts. These results from both courses were notably lower

than were realized in this area during the previous assessment cycle. Students enrolled in GEOG 4360 (Cultural Field Studies) were assessed for knowledge of these concepts, but were assessed via a much smaller set of questions. These students (in 4360) scored 76% on such questions. This was the first time students from this course were assessed for this particular area.

RELATED ITEM LEVEL 3

Acting on Assessment (BS)

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

RELATED ITEM LEVEL 1

Proficiency with Introductory Concepts in Human-Environment Relationships (Goal 4a)

Learning Objective Description:

Students will demonstrate proficiency with introductory concepts pertaining to the relationships between human and environmental systems, concepts that will serve as the foundation and pre-requisites for advanced course-work in the sub-field

RELATED ITEM LEVEL 2

Introductory Concepts of Human-Environment Interaction

Indicator Description:

Questions pertaining to introductory concepts of human-environment interaction will be embedded in exams for introductory geography courses (GEOG 1300, 2341, 2355, and 2356)

Criterion Description:

The average score will be 70% on questions pertaining to introductory concepts of human-environment interaction

Findings Description:

Students enrolled in GEOG 1300 scored on average 67% on embedded questions pertaining to introductory concepts of human environmental interaction. Students enrolled in GEOG 1401 scored on average 66% on such questions. The results for these introductory courses were slightly higher than those realized from the previous assessment cycle.

Students enrolled in advanced geography courses (GEOG 3301. 3350 & 4360) were also assessed for this area. Students enrolled in GEOG 3301 (Environmental Geography) scored on average 71% on a series of embedded questions pertaining to advanced concepts of human-environmental interaction. Students enrolled in GEOG 3350 (Cultural Geography) scored on average 67% a

separate series of embedded questions pertaining to such advanced concepts. Unlike the case with the introductory courses, these results from these two advanced courses were notably lower than were realized in this area during the previous assessment cycle. Students enrolled in GEOG 4360 (Cultural Field Studies) were assessed for knowledge of these concepts, but were assessed via a much smaller set of questions. These students (in 4360) scored 76% on such questions. This was the first time students from this course were assessed for this particular area.

RELATED ITEM LEVEL 3

Acting on Assessment (BS)

RELATED ITEM LEVEL 3

Acting on Assessment for Introductory Advanced Human Geography, Environmental/Physical Geography & Human-Environmental Interaction

Action Description:

Results suggest of several dimensions of this assessment suggest that advanced topics that were covered in smaller break-out discussion groups, or were addressed directly in smaller seminar-type environments generated better student outcomes. Comparatively, student learned advanced topics less efficiently when they were strictly exposed to them via a lecture format. Thus, we will "act" on these results by increasingly incorporating active learning activities and discussions throughout the semester in more courses (when applicable), rather than just utilizing these approaches near the later part of the semester.

When it comes to introductory concepts (human geography, physical/environmental, human-environmental interaction), the most identifiable weaknesses pertain to basic use of statistical data, and a lack of coordination among the different courses. These weaknesses will be addressed in two ways; 1) the offering of a new course that focuses directly on the application of statistical methods specific to geographical subject matter, and 2) the restructuring and re-evaluating of the entire geography curricula (scheduled for 2024-2025).

Goal 5 (BS): Maintain an effective geographical curricula and strong interconnections and linkages across the curricula

Goal Description:

The Geography coordinator and an Assessment Committee will continually gage the degree to which all assessment goals are being met

Providing Department: Geography BS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Assessment Committee Coordination (Supports Goal 5b)

Performance Objective Description:

The Geography coordinator will convene meetings with an Assessment Committee comprised of representatives of the various subfields (Human Geography, Environmental/Physical Geography, and Geo-techniques) to discuss curricula outcomes and potential need for changes

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings

KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Results Description:

The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)
Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 2

Student Satisfaction Survey (supports Performance Objectives 5a and 5b)
KPI Description:

Students will be given a survey their last semester prior to graduation to give feedback on any program issues and on their experiences negotiating the geography programs, including scheduling, course offerings, course content, and overall satisfaction.

Results Description:

A small sample of graduating seniors from the geography program were surveyed. The results suggest a need to better coordinate the courses across the curriculum - students noted that some of the courses operated independently of one another, without any clear linkages or step-wise progression from one course to another. All students survey identified that this was particularly true in regards to the geospatial courses that comprise the program. Students also identified the potential utility of completing a course focused on statistical applications specific to their field of study (geography). One strength recognized by the surveyed students was the perceived benefit of being advised within the department (by geography faculty), as opposed to needing to rely on the SAM Center. For example, students expressed appreciation for the fact that geography faculty were able to recommend elective courses (and internship opportunities) outside the department that aligned well with their academic foci and career goals.

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)
Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

RELATED ITEM LEVEL 1

Coordination and Interconnections Across Geographic Sub-fields (Supports Goal 5a)
Performance Objective Description:
The Geography Coordinator, in consultation with assessment committee, will continually gage the degree to which the various components of the geography curricula are effectively operating

RELATED ITEM LEVEL 2

Geography Curriculum Committee Meetings
KPI Description:
This will include a list of relevant meetings and changes and issues that arise from meetings between the Geography coordinator and the Geography Curriculum Committee

Results Description:
The assessment committee was comprised of three faculty members, each of whom represented three subject areas (human geography, environmental geography, and geospatial technology). Unfortunately, one of the committee members resigned unexpectedly and on short-notice. This particular committee member possessed expertise in the area of geospatial technology (GIS/Remote Sensing). This same individual was also a member of the geography curriculum committee. Accordingly, very little progress was made was made towards enhancing & improving the assessment of this subject area. However, progress was made in terms of the development of a plan of action of how to better assess the other two subject areas (human and physical/environmental geography). Moreover, our meetings also assisted in the development of ideas of how to address identifiable weaknesses recognized via the assessment of these areas (for example, the need to offer a new course that focuses on the application of statistics/quantitative methods specifics to the geosciences; geography & environmental science).

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)
Action Description:
Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

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A small sample of graduating seniors from the geography program were surveyed. The results suggest a need to better coordinate the courses across the curriculum - students noted that some of the courses operated independently of one another, without any clear linkages or step-wise progression from one course to another. All students survey identified that this was particularly true in regards to the geospatial courses that comprise the program. Students also identified the potential utility of completing a course focused on statistical applications specific to their field of study (geography). One strength recognized by the surveyed students was the perceived benefit of being advised within the department (by geography faculty), as opposed to needing to rely on the SAM

Center. For example, students expressed appreciation for the fact that geography faculty were able to recommend elective courses (and internship opportunities) outside the department that aligned well with their academic foci and career goals.

RELATED ITEM LEVEL 3

Acting on Assessment: Goal 5 (Coordination of Curricula)

Action Description:

Results from this assessment suggest a need to incorporate the geography faculty more collectively in the assessment endeavor. A particular need was identified to include faculty possessing expertise in the area of geospatial technology, an area that has became increasingly relevant to students but until now has not been assessed as well as the other aspects of the program. Accordingly, in the future all faculty will be more involved with assessment efforts.

New Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

Going forward our plan to improve our program, and the assessment of it, will focus on four initiatives. 1) We will formulate and implement the operation of sub-committees that will focus on the assessment of specific foci with the curricula (Environmental/Physical geography, human geography, and geospatial techniques). This will lead to a more inclusive assessment mechanism and should enable us to better organize the natural progression of skills and content subject matter from one class to another. The framework for these sub-committees are already in place.

2) Incorporate more geospatial technique courses (Intro to GIS, Applied GIS, Computer Cartography, remote sensing, etc.) into our assessment program. Anecdotally, one of the criticisms of our geospatial program from graduating students has been a lack of coherency from one course to another (at times course content is overlapped, in other ways there is no natural progression of expectations from one course to another - the courses do not build upon one another as well as they should). Future assessments will endeavor to collective determine what skills should be emphasized in each course, therefore allowing for a more coherent curriculum. This will allow us to better assess how effective these courses are at actually teaching students these skills.

3) Continue teaching important statistical skills, as well as skills with the use and interpretation of maps/charts/tables, in smaller, more intimate environments – labs, break-out sections in lectures, etc. Our efforts at doing this very thing have proven successful at enhancing student learning. Accordingly, we will build on these efforts going forward.

4) Continue to include supplementary material (videos, short videos, etc.) in on-line labs, as well as encourage students enrolled in online sections to take advantage of opportunities to virtually communicate with lab TAs and faculty. We will also continue to experiment with better ways to teach critical skills in the online environment.

Update of Progress to the Previous Cycle's PCI:

We implemented portions of our previous improvement plan, but faced challenges due to personnel changes. One faculty member fully resigned, another resigned for an administrative role mid-cycle, and a third served as faculty senate president with significant administrative duties. All three taught geospatial applications courses, severely limiting our ability to increase assessment in that area. Additionally, the faculty member responsible for coordinating the entire assessment plan underwent major surgery during a critical period.

Regarding our four identified initiatives:

1. Subcommittees: Some met to address previous weaknesses and will continue meeting, incorporating more courses into assessment efforts.
2. Incorporating geospatial technique courses (Intro to GIS, Applied GIS, Cartography, Remote Sensing, etc.): We could not fully meet goals due to the personnel issues mentioned. Many courses relied on adjuncts. A new committee has convened to determine emphasized skills for each course to improve future assessment.
3. Teaching statistical skills and map/chart/table interpretation in smaller settings: Our efforts again successfully enhanced learning, though a proposed statistics course specific to geosciences has not yet been created (planned for 2024-25).
4. Supplementary materials in online labs: We continued using videos/materials which proved beneficial. We will expand use of supplements in online and face-to-face courses, building on successes and modifying less effective approaches.

New Plan for Continuous Improvement Item

Closing Summary:

The results of this past assessment seems to suggest that the key to increased student success (or least the key to mitigating challenges that are broad in nature and somewhat out of our control) continues to lie in three areas: 1) teaching certain key concepts (particularly foundational concepts) in smaller, more intimate settings, preferably in face-to-face settings, or via the provision of supplementary material pertaining to such concepts when delivered online; 2) offering courses (or units within pre-existing courses) that more directly focus on critical concepts (especially the basic interpretation of statistical data and maps) and 3) continuing to integrate ours courses into a cohesively linked curricula.

Obviously, there will continue to be a demand to have larger class-sizes, as well as online courses. We plan on coping with this reality by determining key concepts that require critical focus, then trying to incorporate them within lab sections (which by nature are smaller in size). A few faculty have been incorporating active learning techniques (dividing large lecture classes into groups to go over certain key concepts - thus, providing intimate environments, and fostering student-involved learning). We plan to encourage all faculty to use these techniques to a larger degree. Short videos focused on key concepts will be used in some online sections, really the only option in that form of learning environment.

We have yet to fully incorporate some of geotechnique courses into our assessment plan (at least not as fully as other courses). We will be increasingly incorporating these courses into our assessment program. Some of these courses will also play an increased role in offering students experience with basic mapping principles (an identified weakness). Efforts to do this very thing this last year was hampered by the sudden resignation of a critical faculty member teaching in this area. Her position was replaced this past year and a new faculty hire will enable us to re-initiate this agenda. The results from this assessment, and previous assessments, will also be used to inform decision-making when it comes to course offerings developed by the new faculty member scheduled to join the department in Fall 2024.

We will be reforming sub-committees to focus on assessment areas (human geography, environment/physical geography, and geotechnology). These will make efforts to ensure that more courses, and more subject matter, are incorporated into our assessment efforts. This should

allow us to get a better picture of how well we are doing in terms of meeting our curriculum goals.

Department of Mathematics and Statistics

Mathematics BA/BS

Deliver An Upper-Level Curriculum With Appropriate Discipline Specific Knowledge

Goal Description:

The curriculum will address the discipline specific knowledge dictated by professional societies and/or professionals in the workforce for upper-level instruction in mathematics.

Providing Department: Mathematics BA/BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Advanced Areas For Majors

Learning Objective Description:

Students preparing to graduate will demonstrate advanced mathematics knowledge and skills.

RELATED ITEM LEVEL 2

Euclidean Geometry Project (BA) - Math 3363

Indicator Description:

Students will complete a project on the role of proof and technology in communicating mathematics.

Criterion Description:

At the end of the semester, 70% of the students submitting their project will receive a rating of 60 or better (out of 75) according to the attached rubric.

Attached Files

Project description and rubric

Findings Description:

The criterion for this learning objective has been met for multiple years. Mathematics area faculty will consider revising this objective.

RELATED ITEM LEVEL 3

Euclidean Geometry Projects (BA) - Math 3363

Action Description:

The criterion for LO1 has been met for multiple years. Mathematics area faculty will consider revising this objective.

RELATED ITEM LEVEL 2

Introduction to Math Thought portfolio (BS) - Math 3300

Indicator Description:

Students will demonstrate the ability to write direct proofs, proofs by contrapositive, proofs by contradiction, proofs by induction, and proofs by cases.

Criterion Description:

At the end of the semester, students will turn in a portfolio of rewritten past work (or similar) that demonstrates their ability to write each of the five types of proofs listed above. At least 70% of students who turn in portfolios will earn a combined average of at least 75% on these five types of proof in their portfolios.

Findings Description:

Portfolios were not used this academic year. Thus this was not assessed.

RELATED ITEM LEVEL 3

Introduction to Math Thought portfolio (BS) - Math 3300

Action Description:

The Math Area shall revisit the use of portfolios in MATH 3300.

RELATED ITEM LEVEL 2

Undergraduate Research Project (BS) - Math 4395

Indicator Description:

Undergraduate math majors will enroll in Math 4395 in which students perform a semester-long research project (along with discipline-specific professional development activities) with a faculty mentor.

Criterion Description:

At least 10% of our undergraduate math majors per year will enroll in Math 4395 and complete a research project with a faculty mentor.

Findings Description:

This target was not met. The indicator says students will enroll in this course, though it is not a requirement for a math degree.

RELATED ITEM LEVEL 3

Undergraduate Research Project (BS) - Math 4395

Action Description:

The future of associated indicator will be reviewed by the Math program area.

Improve Communication Between Department And Its Majors

Goal Description:

Communicate to our mathematics majors more and better information pertaining to internships, research opportunities, scholarships. etc.

Providing Department: Mathematics BA/BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Improve Communication Between Department And Mathematics Majors

Performance Objective Description:

Communicate to our mathematics majors more and better information pertaining to internships, research opportunities, scholarships. etc.

RELATED ITEM LEVEL 2

Annual meeting with math majors and social media outreach

KPI Description:

Each academic year, a meeting will be held, hosted by the department chair. All mathematics majors will be invited. This one hour meeting will include an introduction of all faculty in the department (via projected slides), a description of some of the research areas in the department (particularly those that have involved students), and a list of opportunities available to our majors.

These opportunities might involve departmental scholarships and awards, employment opportunities, and conferences available for travel. In addition, we will describe REUs (those both local and external) to the students and encourage students to apply.

The purposes of these meetings are (1.) to inform students of opportunities in the department, (2.) to recruit math majors into our stat minor program, and (3.) to foster a sense of belonging in the department of each one of our mathematics majors.

Target Description:

Successful completion of this KPI would result in one meeting per academic year.

Results Description:

This target was not met due to a number of factors. The department chair was new and had many other urgent matters that took priority including staffing of classes, student complaints (proportional to number SCHs - plus it is math), non-TSI complete student issues, FES, tenure and promotion (the math/stat faculty is large), immigration & residency sponsorship, assessment, scheduling of classes, etc. We were also short a staff member in the spring A majors meeting is being planned for fall 2024.

RELATED ITEM LEVEL 3

Annual meeting with all math majors and social media outreach

Action Description:

The department chair and office staff are planning for a meeting of math major in Fall 2024.

Increase student success and academic preparation in Math 1420 and Math 1430.

Goal Description:

Improve attrition rates in the calculus sequence.

Providing Department: Mathematics BA/BS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Foundation Areas - Differential Calculus

Learning Objective Description:

Students will demonstrate the following knowledge and skills: differentiation of standard mathematical functions, application of the Fundamental Theorem of Calculus to the evaluation of integrals, a broad understanding of integration techniques, using calculus techniques to solve optimization problems, and convergence properties of infinite sequences and series.

RELATED ITEM LEVEL 2

Assessment in Math 1420 and Math 1430

Indicator Description:

Create assessment portfolios that can be used in active learning sections of Calculus I and Calculus II to better align the way that we assess our students in these courses.

Criterion Description:

Active learning in Math 1420 and Math 1430 will use a wide variety of assessment strategies which may include group and individual projects, informal student presentations, exams with group and individual portions, techniques from mastery-based assessment, and more. In particular, each learning objective will correspond to multiple items in the assessment portfolio to provide a broad picture about student mastery or proficiency

Findings Description:

This item ended up not being assessed this academic year.

RELATED ITEM LEVEL 3

Assessment in Math 1420 and Math 1430

Action Description:

The indicator "Create assessment portfolios that can be used in active learning sections of Calculus I and Calculus II to better align the way that we assess our students in these courses" was not assessed and will be reviewed by the Math program area for future use.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The indicator descriptions for both Math 3300 and Math 1420/1420 are appropriate, however the criteria are not applicable as they do not actually describe current practices. In Math 1420/1430, the math area will need to determine how to better assess the overall performance of our students rather than using portfolios since it appears that these are not being used by most instructors. One idea is to give all of our students a few common final exam questions that address some of the core learning objectives and which would be given to all students in all courses. This would provide us a data set that could help to elucidate overall student performance. Because the assessment portfolios are also not being administered in Math 3300, we will need to update our criteria to better reflect assessment practices in this area.

We will continue to look for and pursue effective means of communicating with our students.

Update of Progress to the Previous Cycle's PCI:

The department struggled to address the issues raised in the Previous Cycle's PCI. This was due to frequent turnover in department leadership, and new leadership being unfamiliar with assessment timelines and reporting norms. Moreover, faculty are stretched thin for time and attention, especially since there appears to be an increase in the amount of attention and support that faculty need to provide students in and outside of the classroom. The department can, again, make an effort to better assess MATH 3300, 1420 and 1430 by first determining how to better assess the overall performance of our students, potentially through the use of a few common final exam questions in 1420/1430, and by updating our criteria for MATH 3300 to better reflect assessment practices in this area.

With regards to better communication with our majors, Campus Connect was used by the department to reach out to students regarding things that are relevant to their degree program.

New Plan for Continuous Improvement Item

Closing Summary:

The department will, again, make an effort to better assess MATH 3300, 1420 and 1430 by first determining how to better assess the overall performance of our students, potentially through the use of a few common final exam questions in 1420/1430, and by updating our criteria for MATH 3300 to better reflect assessment practices in this area.

The department will create a new committee who's charge is to produce a plan for recruitment and retention of students in the BA/BS. This committee will help with the planning of Saturday@Sam, Preview@Sam, the Majors Fair, etc. The committee will also assist in hosting a majors meeting for current or potentially interested BS/BA students.

The department chair will seek opportunities to build outside relationships with potential employers and /or donors.

Mathematics MA

Deliver A Curriculum With Appropriate Discipline Specific Knowledge

Goal Description:

The MA program prepares students to teach undergraduate mathematics at the community college level, to teach dual credit or AP courses at the high school level, and/or to pursue further education at the doctoral level in mathematics education. The curriculum will address the discipline specific knowledge as dictated by professional societies (e.g., the American Mathematical Society (AMS), the Mathematical Association of America (MAA), the American Educational Research Association (AERA), the National Council of Teachers of Mathematics (NCTM), and the Association of Mathematics Teacher Educators (AMTE)) and/or professionals in the workforce (e.g., local community colleges (such as Lone Star and Blinn), Texas legislative mandates, and the Texas Education Agency (TEA)). Specifically, MA students will successfully complete:

- 4 core area courses (Algebra, Geometry, Analysis, and Probability/Statistics)
- an oral comprehensive exam covering the 4 core area courses
- an individualized mathematics education related capstone experience resulting in a specific completed product that could be used as part of an application to a doctoral program
- a minimum of 18 credits of pure MATH courses without any reference to "for teachers" in either the title or description of the course
- a pedagogical issues in undergraduate mathematics education course

Providing Department: Mathematics MA

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Understanding Mathematical Structures

Learning Objective Description:

Students will prove theorems, solve problems and/or explain concepts in the following core areas

- abstract algebra structures such as groups, rings, fields, functions, homomorphisms, and isomorphisms.
- differential and integral calculus
- probability and statistics, particularly inferential statistics, and
- transformational geometry to include isometrics and non-isometric transformations such as circles of inversion.

Students will demonstrate their knowledge, skills, and abilities in these core areas by earned B's or higher in each course and passing a comprehensive oral examination.

Students will further complete a minimum of 18 credit hours of MATH coursework without "for teachers" in either the title or description of the course.

RELATED ITEM LEVEL 2

MA Comprehensive Oral Examination

Indicator Description:

Students in the MA program will take an oral examination over the four areas covered in the objective. The oral examination will be scored by a committee of faculty using a rubric developed and approved by department faculty.

Criterion Description:

100% of the MA students will receive a grade of "Pass" or "High Pass" on each of the four areas according to the attached rubric.

Attached Files

Grading Scheme for MA Orals.pdf

Findings Description:

During the 2023-24 assessment cycle, 8 students attempted and passed their oral comprehensive exams as follows:

Algebra: Pass (1 with zero needing a retake); High Pass (7)

Geometry: Pass (2 with zero needing a retake); High Pass (6)

Analysis: Pass (4 with zero needing a retake); High Pass (4)

Probability and Statistics (3 with zero needing a retake); High Pass (5)

The data used from the previous year allowed us to improve the preparation we offered in the CORE classes so that no one needed to retake any portion of their exams (a first for the program since we began to keep track of the data) and there was an overall increase in High Pass rates from 21.9% in 2023 to 68.8% in 2024.

RELATED ITEM LEVEL 3

MA Comprehensive Oral Examination Action

Action Description:

During the 2024-25 cycle, data similar to that collected last year will be collected. This data will then be used to evaluate how to improve CORE courses replicate the improvement in retake rates and increase High Pass rates.

RELATED ITEM LEVEL 2

Successful completion of 4 core courses

Indicator Description:

Students in the MA program will successfully complete MATH 5386 (Concepts in Modern Algebra), MATH 5387 (Concepts in Transformational Geometry), MATH 5388 (Concepts in Analysis), and MATH 5389 (Concepts in Probability and Statistics).

Criterion Description:

100% of the MA student will earn B's or higher in all four core courses.

Findings Description:

During the 2023-24 cycle, the following CORE courses were offered with the included results:

Summer 23: MATH 5388: Concepts in Analysis; Enrollment: 12

1. Grade of A (8)
2. Grade of B (3)
3. Grade of C (1)

Fall 23: MATH 5389 Concepts in Probability and Statistics; Enrollment: 13

1. Grade of A (12)
2. Grade of B (1)

RELATED ITEM LEVEL 3

Successful completion of 4 core courses Action

Action Description:

Based on Summer 23 results for MATH 5388, a schedule change was made so that MATH 5388 will only be offered in Fall or Spring semesters allow for better passing rates as a summer term proved to short for everyone to succeed.

During the 2024-25 cycle, data similar to that collected for MATH 5389 and MATH 5388 during the last year will be collected for MATH 5386, MATH 5387, and MATH 5388. Pass rate data will then be used to evaluate ways to improve CORE courses.

RELATED ITEM LEVEL 2

Successful completion of pure math and pedagogical issues coursework
Indicator Description:
Students in the MA program will complete a minimum of 18 credit hours of MATH coursework without "for teachers" in the title or description and a pedagogical issues in undergraduate mathematics education course.

Criterion Description:
100% of the MA students will earn an overall GPA of 3.0 or higher in all their coursework.

Findings Description:
During the 2023-24 cycle MA students enrolled in the following courses:

Summer 2023:

1. MATH 6382 Pedagogical Issues in Undergraduate Mathematics Education (9)
2. MATH 5388 Concepts in Analysis (12)
3. CIED 5343 Philosophy of Education (1)

Fall 2023:

1. MATH 5389 Concepts in Probability and Statistics (12)
2. MATH 6361 Logic and Set Theory (5)
3. MATH 6060 Independent Study (1)
4. CIED 5382 Instructional Coaching (1)
5. CIED 5341 Comparative Education (1)
6. CIED 5333 Professional Educator's Role (1)
7. CIED 5360 Advanced Techniques & Methods of Instruction (1)

Spring 2024:

1. MATH 6387 Concepts in Linear Algebra (13)
2. MATH 6386 Number Theory (10)
3. CIED 5383 Integrating Current Technology in Teaching (4)
4. CIED 5340 Foundations of US Education Curriculum and Instruction (2)
5. CIED 5382 Instructional Coaching (1)
6. CIED 5384 Curricular Trends (1)
7. CIED 5397 Human Growth and Development Across the Lifespan (1)
8. CIED 5370 Research in Teaching (1)

Only one student did not earn a 3.0 in Summer 2023 and was placed on probation.

RELATED ITEM LEVEL 3

Successful completion of pure math and pedagogical issues coursework Action
Action Description:

During the 2024-25 cycle similar data as 2023-24 will be collected on course enrollment of MA students to understand enrollment patterns and improve course offerings. It is apparent that some MATH electives are not as attractive as some CIED courses. During 2024-25, we will look at reasons why some MATH electives are not chosen as often as others by taking with students and understanding why they chose a CIED course over another MATH elective.

RELATED ITEM LEVEL 1

Develop 100% Online MA Program

Performance Objective Description:

Students are required to have a minimum of 18 credit hours of MATH coursework without "for teachers" in the title or course description. As such, the program needs a variety of elective courses offered every semester. The program has yet to have full slate of permanent electives available to provide students the optimal opportunity to meet the learning objective for the program. As such, the MA advisor will work on transitioning Special Topics Courses to regularly offered elective courses that fit the criteria for the program.

RELATED ITEM LEVEL 2

Submit Form B's to turn special topics courses into permanent courses

KPI Description:

In order to have enough elective MATH courses for students in the MA program to have the optimal opportunity to take a minimum of 18 MATH credit hours without "for teachers' in the title or course description, a Form B for Concepts in Quantitative Research Methods which was taught as a Special Topics course in Summer 2022 needs to be submitted through the proper channels to be approved.

Target Description:

By Summer 2023, the Form B for MATH 6385 will be submitted for the University Curriculum Committee's approval.

Results Description:

As of the date of this report, the Form B for MATH 6385 has not been submitted. It will be submitted over 2024-25.

RELATED ITEM LEVEL 3

Submit Form B for last Special Topics Course

Action Description:

The Form B to change the last special topics course (related to applied statistics--although the name is yet to be determined) will be submitted over 2024-25. It was taught during Summer 2024 as a Special topics course and it was thought best to wait until after that to submit the Form B.

RELATED ITEM LEVEL 1

Program Evaluation

Performance Objective Description:

In order to assess the effectiveness of the MA program learning goals with respect to student learning, faculty will work together to develop a plan to be able to evaluate the effectiveness of the assessment measures of the Mathematics MA program.

RELATED ITEM LEVEL 2

Alumni Formal Assessments of MA Program

KPI Description:

In order to better evaluate the effectiveness of the MA program, it would be helpful to get regular feedback from alumni as to the impact of their participation in the MA program on their career goals. In order to facilitate this, the graduate advisor will create and update two SHSU MA Alumni email

lists. One will be of SHSU emails and one will be of personal emails collected as students graduate. Over time this should allow program administrators to effectively contact alumni for program evaluation purposes.

The MA graduate coordinator will continue to add to and manage the two email distribution lists during 2023-24.

Target Description:
The MA graduate coordinator will manage and update the two email distribution lists at the end of every semester/term in order to gradually collect current alumni contact information.

Results Description:
The two email distribution lists were managed and updated at the end of each semester/term. There are now 15 current email addresses for alumni graduating between Fall 21 and Spring 24. The current 25 students are also updated as of Summer 24.

RELATED ITEM LEVEL 3

Alumni Formal Assessments of MA Program Action
Action Description:
The MA graduate coordinator will add to and manage the alumni distribution lists with throughout 2023-24.

RELATED ITEM LEVEL 1

Refine and implement an effective marketing strategy to increase enrollment
Performance Objective Description:
During the 2023-2024 academic year, we will continue to refine and implement the marketing plan developed during the 2022-23 academic year for the 100% online MA program in order to continue to increase enrollment to the desired amount of 30 students in any given semester.

RELATED ITEM LEVEL 2

Implement Marketing Plan
KPI Description:
By the end of Spring 2023, we will have begun to implement the revised Math MA marketing plan.

We will specifically ensure the MA websites are prepared to optimize search engine's abilities to find us. We will continue to target potential students using a combination of 80% search engine optimization and 20% social media advertisement based on on our initial funding. Funding will be sought for two campaigns a year rather than one.

(in Fall 2023 we will evaluate the effectiveness of our plan by obtaining data on the number of positive search engine searches, the number of social media clicks, and the number of inquiries and applications for the Math MA program compared to Fall 2022.)

Target Description:
By December 2023, the marketing team will meet to assess the effectiveness of the optimization plans from the previous campaign. By January 2024, funding will be sought via the department, the graduate school, SHSU online, and the dean's office to fund two marketing campaigns a year, rather than just one.

Results Description:
The marketing plan was significantly delayed and did not start until June 1st due to changes in the university's approach to marketing. While $5000 was procured from COSET and $3000 from the department, this delay in marketing affected Summer 2023 enrollment.

RELATED ITEM LEVEL 3

Implement Marketing Plan Action

Action Description:

By December of 2024, the graduate advisor for the MA program will meet with SHSU marketing to refine the marketing plan based on the 2023-24 results and meet with the chair of the math/stats department, the dean of COSET, and the dean of the Graduate School to solicit funding to support the refined marketing plan.

By January 2025 there will be:

1. a refined marketing plan for the MA program
2. at least 2 meetings with SHSU marketing
3. at least one meeting with the chair of the MATH/STAT department to solicit department funding
4. at least one meeting with the dean of the COSET to solicit college funding
5. at least one meeting with SHSU online to solicit additional funding
6. at least one meeting with the dean of the Graduate School to solicit additional funding

Develop Research Skills

Goal Description:

Students will develop research skills commensurate with graduate student status and that could be relevant to their future teaching careers.

Providing Department: Mathematics MA

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Demonstrate Research Skills

Learning Objective Description:

Students completing the MA in Mathematics will demonstrate mathematics education research skills by successfully completing an individualized capstone project in Math 5380 with an advisor. They will demonstrate their acquired knowledge, skills, and abilities from throughout the program through at least two of the following:

- Earning a B or higher in the course.
- Submitting a conference proposal to present their project results.
- Submitting a paper on the results of their project for publication in either a practitioner or research focused journal geared towards graduate student research.
- Creating and utilizing curriculum materials (text, technological applications, and/or media) developed through their project.
- Reflecting in writing on the research process and its applicability to their future career goals.
- Using their capstone experience to help them apply for further education at the doctoral level.

RELATED ITEM LEVEL 2

Research Project Assessment

Indicator Description:

MA students complete an independent mathematics education research project. The student works with a supervising professor who oversees and evaluates the work required of the student. A grade is assigned based on the individual requirements set forth by the supervising professor. In addition al least one written product will result from the project.

Criterion Description:
Students will be rated at least 80% on the research project rubric. Each student will be evaluated on an individualized rubric by their supervising professor.

At least one of the following written products will result from the project:

- Submitting a conference proposal to present their project results.
- Submitting a paper on the results of their project for publication in either a practitioner or research-focused journal geared towards graduate student research.
- Creating and utilizing curriculum materials (text, technological applications, and/or media) developed through their project.
- Reflecting in writing on the research process and its applicability to their future career goals.
- Using their capstone experience to help them apply for further education at the doctoral level.

Findings Description:
During the Summer of 2023, 3 students completed an independent mathematics education research project. 2 created and utilized curriculum materials developed through their projects. 1 used their capstone experience to help them in their position as their school's assessment specialist. All passed MATH 5380 with A's.

During Fall 2023, 1 student completed an independent mathematics education research project which resulted in online presentation to other MA students and colleagues at her community college. She passed MATH 5380 with an A.

During Spring 2023, 3 students completed an independent mathematics education research project. 1 created and utilized curriculum materials developed through their projects. 2 used their capstone experience to help them in their position as analyzing their school mathematics data. All passed MATH 5380 with A's.

RELATED ITEM LEVEL 3

Research Project Assessment Action
Action Description:
During the 2024-25 cycle, data similar to that collected during 2023-24 will be collected on MATH 5380. This data will be used to evaluate the effectiveness of MATH 5380.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary
Building on the 2022-23 cycle, we will make the following improvements during the 2023-24 cycle:

1. To move forward in our Alumni Formal Assessments of MA Program, the MA Graduate Coordinator will continue to collect personal email addresses of our graduates as part of a distribution list of MA Alumni in order to send out a survey to assess the effectiveness of the MA program at a future date.
2. To further market the 100% online MA program, we will requested $2000 from the department to fund a continued marketing campaign going into Fall 2023 and Spring 2024. We will tweak what we learned from the last marketing campaign. We will then request $2000-$3000 each from COSET and the School of Graduate Studies. The goal is to have an eventual enrollment of at least 30 students with a possibility of up to 45.
3. During Summer 2023, we will have 3 students participate in their oral comprehensive exams. In Fall 23, we will have 3 and in Spring 24 we will have 6. We will continue to collect data on retakes, pass, and high pass designations to better improve our 4 course courses.
4. During 2023-2024 we anticipate 8 students completing research projects (3 in Summer 2023, 2 in Fall 2023, and 3 in Spring 24).

5. During the Summer 23 and then throughout the process in 23-24, we will submit a revised Form B for Special Topics Course (MATH 5360) Quantitative Research in Education (this title may be revised) as we continue to round out the elective courses for the 100% online MA program.
6. In the 2023-2024 academic year, we anticipate conducting 11 oral comprehensive exams. This is quite large and very demanding on faculty's time. We will utilized a rotating Zoom approach where up to 4 students can be assessed in the same 2 hour block.

Update of Progress to the Previous Cycle's PCI:

Here is the progress we made on our plan for continuous improvement:

1. To move forward in our Alumni Formal Assessments of MA Program, the MA Graduate Coordinator continued to collect personal email addresses of our graduates as part of a distribution list of MA Alumni in order to send out a survey to assess the effectiveness of the MA program at a future date.
2. To further market the 100% online MA program, we were given $3000 from the department and $5000 from COSET. We tweaked what we learned from the last marketing campaign. The goal is to have an eventual enrollment of at least 30 students with a possibility of up to 45. We currently have 24 students who will be enrolled for Fall 23. The Spring marketing campaign was delayed from March until June of 2024 so that has impacted enrollment.
3. During Summer 23, we will had 3 students participate in their oral comprehensive exams. During Fall 2023, we will had 1 students participate. During Spring 2024, we had 3 students participate. During Summer 2024, we will have 2 more students participate.
4. During 2024-2025 we anticipate 9 students completing research projects (2 in Summer 2024, 3 in Fall 2024, and 4 in Spring 25).
5. During the Summer 24 and then throughout the process in 24-25, we will submit a revised Form B for Special Topics Course (MATH 5360) Quantitative Research in Education (this title may be revised) as we continue to round out the elective courses for the 100% online MA program.
6. During the 2023-24 year we revisited our procedures for oral comprehensive exams which resulted in much better retake rate (0%) and much higher High Pass rates (67.8%). In the 2024-2025 academic year, we anticipate conducting 6 exams. We will continue to utilize a rotating Zoom approach where up to 4 students can be assessed in the same 2 hour block.

New Plan for Continuous Improvement Item

Closing Summary:

Building on the 2023-24 cycle, we will make the following improvements during the 2024-25 cycle:

1. To move forward in our Alumni Formal Assessments of MA Program, the MA Graduate Coordinator continued to collect personal email addresses of our graduates as part of a distribution list of MA Alumni in order to send out a survey to assess the effectiveness of the MA program at a future date.
2. To further market the 100% online MA program, we were given $3000 from the department and $5000 from COSET. We tweaked what we learned from the last marketing campaign. The goal is to have an eventual enrollment of at least 30 students with a possibility of up to 45. We currently have 24 students who will be enrolled for Fall 23. The Spring marketing campaign was delayed from March until June of 2024 so that has impacted enrollment.
3. During Summer 23, we will had 3 students participate in their oral comprehensive exams. During Fall 2023, we will had 1 students participate. During Spring 2024, we had 3 students participate. During Summer 2024, we will have 2 more students participate.
4. During 2024-2025 we anticipate 9 students completing research projects (2 in Summer 2024, 3 in Fall 2024, and 4 in Spring 25).
5. During the Summer 24 and then throughout the process in 24-25, we will submit a revised Form B for Special Topics Course (MATH 5360) Quantitative Research in Education (this title may be revised) as we continue to round out the elective courses for the 100% online MA program.

6. During the 2023-24 year we revisited our procedures for oral comprehensive exams which resulted in much better retake rate (0%) and much higher High Pass rates (67.8%). In the 2024-2025 academic year, we anticipate conducting 6 exams. We will continue to utilize a rotating Zoom approach where up to 4 students can be assessed in the same 2 hour block.

Mathematics MS

Emphasize Communication Skills

Goal Description:

The curriculum will provide students with opportunities to develop communication skills typically required of professionals in the area of study. Thesis students typically gain experience with written communication automatically as a part of the thesis writing process, and our non-thesis students will receive similar training as they create a written report with their research advisor. Moreover, our sequence of required courses that are not a part of the core now require writing intensive tasks throughout the four semesters that our students are enrolled. Oral communication skills are obtained in the taking of classes, in the teaching of classes, and in oral communication with other professionals about their work.

Providing Department: Mathematics MS

Progress: Ongoing

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Competence Teaching at the College Level

Learning Objective Description:

Prior to graduation, each student in the M.S. program should successfully complete at least one semester as a teaching assistant in the department. Our graduate T.A.'s are typically responsible for one freshman-level course in the core curriculum, like college algebra, plus one section of a corresponding co-requisite developmental course. This experience can help students who will later pursue a Ph.D. program and those who intend to teach at the college level after graduation.

RELATED ITEM LEVEL 2

Teaching Mentorship

Indicator Description:

Graduate students will observe faculty classes and report techniques to each other.

Criterion Description:

Because many of our MS students will either continue in doctoral programs (which require teaching as part of their graduate assistantships) or as instructors at 2-year schools, quality teacher training is a valuable component of our MS program. Almost all of our tenure-track mathematics faculty regularly experiment in their classrooms with evidence-based, innovative teaching techniques. This will be shared with graduate students, along with an examination of current literature on teaching methods for higher education.

Findings Description:

In Spring 24, students who are expected to teach in Fall 24 attended a class taught by one of our visiting faculty. These students wrote reflections on techniques they witnessed in that faculty member's class that they would like to implement themselves when they begin teaching. All of the students completed this assignment.

RELATED ITEM LEVEL 3

Action - Teaching Mentorship

Action Description:

In the 23/24 academic year, our teaching mentorship program was more ad hoc than usual, as the graduate coordinator was new in this position. In the 24/25 academic year, the coordinator for this program will carefully plan for future years which ways to best support our students in their assistantship duties.

RELATED ITEM LEVEL 1

Competence in a Wide Range of Mathematical Subject Areas

Learning Objective Description:

Beyond the core courses in algebra and analysis, students in the M.S. program are required to complete coursework in the content areas of combinatorics, complex-valued functions, numerical analysis and topology. By successfully completing all four courses, students will demonstrate competence in a much wider range of mathematical subject areas than they typically encounter as undergraduate students.

RELATED ITEM LEVEL 2

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

RELATED ITEM LEVEL 3

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

RELATED ITEM LEVEL 1

Demonstrate Graduate-Level Research Skills

Learning Objective Description:

Students completing the MS with a thesis will demonstrate skills in completing original research.

RELATED ITEM LEVEL 2

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

RELATED ITEM LEVEL 3

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

RELATED ITEM LEVEL 2

Effective Capstone Courses for Thesis and Non-Thesis Students

Indicator Description:

In order to ensure a successful research experience for both thesis and non-thesis students, our program offers courses that correspond to both concentrations. Thesis students complete both MATH 6398 and MATH 6099 while working independently with their thesis advisor to complete a research project and then write and defend their thesis based on that research. Non-thesis students must complete MATH 6380, typically during their third semester, and course requirements include both a written report on their research (to be approved by their research advisor) and a presentation of their research that could be in a poster session, a local seminar, or at an external conference.

Criterion Description:

We expect all graduate students in the program to complete the research requirements corresponding to their degree plan concentration (thesis or non-thesis).

Findings Description:

In the 23/24 school year, both students who were eligible to complete the research requirement chose the non-thesis track, requiring them to take MATH 6380, so the program met the expected criterion. Both students successfully completed their research requirements by presenting their work in written and oral format, as required by the indicator.

RELATED ITEM LEVEL 3

Action - Effective Capstone Courses for Thesis and Non-Thesis Students

Action Description:

The capstone courses in the M.S. program are working well. For the next year, the graduate coordinator will monitor student progress in this area for any necessary changes.

RELATED ITEM LEVEL 1

Demonstrate Mastery of Core Topics in Mathematics

Learning Objective Description:

The current core courses in our MS program are the sequences in algebra and analysis. Upon completion of these sequences, students will demonstrate mastery of both topics by successfully completing the corresponding comprehensive examinations.

RELATED ITEM LEVEL 2

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

RELATED ITEM LEVEL 3

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

Establish 4+1 BS/MS Degree Plan

Goal Description:

Following the lead of the computer science department, we established a 4+1 BS/MS degree plan in mathematics. This program will serve students who are interested in pursuing both degrees at SHSU and attract transfer students who have not yet completed their BS degree and have an interest in completing both a BS and MS in mathematics. We will work to attract students for enrollment in this program.

Providing Department: Mathematics MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Recruit for 4+1 program

Performance Objective Description:

We will produce literature to advertise the program as well as approach students in mathematics classes who would be good candidates for the program.

RELATED ITEM LEVEL 2

Update graduate and undergraduate catalogues to include 4+1 degree pathway

KPI Description:

Submit documentation to SHSU catalogue to establish 4+1 degree pathway

Target Description:

B.S./M.S. 4+1 degree pathway appears in 2024 catalogue.

Results Description:

Documentation for the B.S./M.S. degree pathway has been submitted and appears in the 24/25 catalog.

RELATED ITEM LEVEL 3

Action - Update graduate and undergraduate catalogues to include 4+1 degree pathway

Action Description:

This item has been completed. No further action is required.

New Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

1. Piloting a summer internship program for students who enroll in Fall 2023 or Spring 2024, in coordination with recent graduates who are currently working in local industry positions.
2. Rebooting the Graduate Teaching Seminar for new students who will become Teaching Assistants in Fall 2024.
3. Continuing the Calculus/College Algebra Tutoring programs from Spring 2023, in coordination with the ASC, to provide an appropriate environment for graduate students to assist with freshman-level courses in these subjects.
4. Completing the proposal of a 5-year BS/MS program in mathematics, with guidance from the new department chair.

Update of Progress to the Previous Cycle's PCI:

1. At least one student applied for an internship program. Department leadership is working toward support of an internship program at the department level.

2. The former iteration of the Graduate Teaching Seminar was not viable in the 23/24 academic year because of low enrollment of second year students. Instead, students attended faculty classes and wrote reflections of their experiences.

3. The Calculus/College Algebra Tutoring programs were quite successful in the 23/24 academic year.

4. The BS/MS program was added to the catalog in 2024.

New Plan for Continuous Improvement Item

Closing Summary:

In the 24/25 academic year, the M.S. Mathematics program will make steps toward improvement in the following ways:

1. The graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

2. The graduate coordinator will reconsider the current implementation of the teaching mentorship program in an effort to support the graduate assistants and teaching assistants in their duties.

3. The program will continue to offer Calculus/College Algebra Tutoring programs, which began in Spring 2023, in coordination with the ASC, to provide an appropriate environment for graduate students to assist with freshman-level courses in these subjects.

Statistics and Data Science MS

Consistent Cohort Of Graduate Students Each Year

Goal Description:

A cohort of ten supported graduate students to admit each year. This allows us to maintain a healthy program with consistent class sizes and class schedules.

Providing Department: Statistics and Data Science MS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Support Ten New Students Each Year

Learning Objective Description:

We will support ten new graduate students each year, as many as twenty in the two years of our program. Support should be such that the full-time students are supported by at least $10,000 more than the cost of tuition and fees.

RELATED ITEM LEVEL 2

Foster a thriving MS program

Indicator Description:

In order to foster a thriving MS program in statistics, we need a total of 20 students, ideally 10 students per cohort. Any less than this, and our classes fail to run regularly. Any more than this, and the research needs of the students in such a large program exceed the faculty support available.

Criterion Description:

We will recruit enough students to be able to accept a cohort of 10 qualified incoming MS students each fall semester.

Findings Description:

This target was not met. The program relies heavily on international students which often have difficulty in obtaining the fund and necessary visas. We have 14 GA's allocated in the program and we were able to admit one more making 15 students in the program.

RELATED ITEM LEVEL 3

Foster a thriving MS Program

Action Description:

The Statistics program area will continue to try and recruit local and international students and to accept in a timely manner to be eligible for additional scholarships. The department will continue to advocated for higher graduate stipends.

Deliver A Curriculum That Emphasizes Communication Skills

Goal Description:

The curriculum will provide students with opportunities to develop the appropriate speaking, analyzing, and writing skills to function as a professional in the subject area. Our sequence of courses for four semester train the students in these skills. Students gain these experiences through different class projects which includes the oral presentation and written report. Students gain these experiences as a part of the Practicum requirement as well.

Providing Department: Statistics and Data Science MS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Communicating Mathematical Ideas - Oral

Learning Objective Description:

Students will be able to prepare and deliver oral presentations of mathematical material through statistics practicum. Students will develop the ability to critique real world problems, and provide their own solutions based on statistical analysis.

RELATED ITEM LEVEL 2

Statistics Practicum

Indicator Description:

A statistics practicum(Registered under STAT 6380) should be completed by the students under the guidance of one of the faculty members (practicum supervisor). Students are required to prepare the final report in the form of manuscript that includes abstract, introduction, methodology, results, and conclusion. A letter grade is assigned for the practicum by the supervising faculty based on performance throughout the research project.

Criterion Description:

All candidates will receive a letter grade by his/her supervising faculty.

Findings Description:

All second year Statistics & Data Science graduate students except one completed the practicum. One student is working now and we are expecting him to finish in July.

RELATED ITEM LEVEL 3

Statistics Practicum

Action Description:

The Statistics program area will consider ways of improving the evaluation of student performance in the practicum, for example developing a rubric to be used.

Deliver A Curriculum With Appropriate Discipline Specific Skill Sets

Goal Description:

The curriculum will provide students with opportunities to develop professional skills typically required in the area of study. Our course sequence and practicum provide students data analysis, presentation, and report writing skills using different statistical softwares.

Providing Department: Statistics and Data Science MS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Foundation Areas In Probability And Statistics

Learning Objective Description:

Students will have a working knowledge of the foundational topics including regression analysis, design of experiments, multivariate analysis, and mathematical statistics (Bayesian analysis, bio-statistics, quality control, non-parametric statistics, sampling theory, Time Series Analysis, and statistical computing,).

RELATED ITEM LEVEL 2

Comprehensive Oral Examination

Indicator Description:

A comprehensive oral examination, given by a committee of three or more faculty members, will be administered to candidates for the degree of M.S. in Statistics which will examine the candidate's knowledge of the primary areas of concentration within the program, as well as the candidates own communication abilities. The committee will then judge the candidates' knowledge on the materials according to a previously agreed upon rubric with three levels of comparison: High Pass, Pass, and Fail.

Criterion Description:
All candidates will receive a mark of either "High Pass" or "Pass" for the components of the comprehensive oral exam. The rubric used is the same one shown in the "Mathematical Statistics" criterion.

Findings Description:
In April, there were 4 grad students who took the oral exam. There was one high pass, and the other 3 passed either 2 or 3 courses out of 4, and had to retake one or two after at least one week. One student will take the oral exam in July, 2024. Though, oral communication of mathematical ideas and the basics of probability and statistics are current LOs, the comprehensive exam does not disaggregate these two.

RELATED ITEM LEVEL 3

Comprehensive Oral Examination
Action Description:
The Statistics program area will consider establishing a target pass rate for the comprehensive exams in the five compulsory courses.

Improve Instruction By TAs

Goal Description:
We will improve our instructional support for TA instruction in our elementary level Statistics courses. The designated faculty (course-coordinator) trains them for teaching before the semester starts. We will also encourage our assistants to attend the training conducted by GUIA (The Graduate/Undergraduate Instructor Academy.

Providing Department: Statistics and Data Science MS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Encourage And Train Teaching Assistants For Teaching
Learning Objective Description:

Will encourage and assign teaching assistants in elementary statistics courses as instructors. The designated faculty (course-coordinator) will train them for teaching. We will also encourage our assistants to attend the training conducted by GUIA (The Graduate/Undergraduate Instructor Academy.

RELATED ITEM LEVEL 2

Evaluation of TA's
Indicator Description:

Teaching evaluations and classroom visits by faculty. These visits will be managed/scheduled by the graduate advisor and/or course coordinators.

Criterion Description:
As many of our teaching assistants are not native speakers, a language barrier may be an additional challenge in their classroom.

Findings Description:
There were no classroom observation for stats TA's this academic year.

RELATED ITEM LEVEL 3

Evaluation TA
Action Description:
The indicator of pertaining to the observation of TA's will be reviewed Statistics program area to determine if this is still an appropriate indicator.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):
We will make an effort to increase our funded student cohort size to 10 which will make our total number of funded positions for the program to be 20 students. We can serve our undergraduate students better if we have 20 funded students in our program. We have around 22 sections of STAT/MATH 3379 and 20 sections of MATH 1342 each semester. We use our second-year teaching assistants to teach MATH 1342 and graduate assistants to help with SPSS (statistical programing) and tutoring. Having more graduate assistants will make a significant impact on the success of our undergraduate students.
A good number of excellent graduate students used to apply to our Statistics program, but many eventually declined after getting higher TA financial offers from more competitive Universities. Recently, we are struggling to recruit good TA's in our program. This type of erosion obviously becomes a pronounced problem for any program. We have identified this as a serious issue for our program. We will continue to request the university to provide additional funding to overcome this problem. The current funding we provide them is not sufficient to pay the tuition fee and other expenses. This is encouraging them to join or transfer to other universities.

We will provide students with more professional development opportunities. Will continuously organize student weekly group sessions where the students can make presentations in a friendly environment. This is a great opportunity for them to learn how to present their research projects. We observed that our students benefited from it significantly so will continue to do this in the coming academic year as well.

We will continue to assign our second-year students to teach introductory statistics courses as instructors of record. We will continue to encourage our students to go through the PACE program graduate teaching perforation training certification. We also encourage our students to go through other professional development programs (Many are available online now).

Update of Progress to the Previous Cycle's PCI:
We were not able to achieve our goals as we planned. Our plan to produce more researchers, leaders, teachers, and experts in the field of statistics to fulfill the current demand did not meet as we expected. Not only this, we need more assistants to help our undergraduate classes which will be our source for the graduate recruitments. But with limited funding, we could not hire as many assistants as we thought. Also, the stipend we give them is not enough to cover their basic expenses including tuition fees. This is restricting us to recruit the good students for our program.

We will continue with the same plan for the upcoming year. We believe this would be a good opportunity to raise the issues mentioned above to help improving our program. Low stipend is the main issue we we would like to bring in attention to the University.

We will continue to provide professional development opportunities and prepare our students to be fulfill the current demand in solving the real world problems. We can assign all of our second year student to teach our introductory statistics classes if we become competitive in hiring and able to offer Assistantship to more qualified applicants. Assigning them in teaching will help the University/Department financially as well.

New Plan for Continuous Improvement

Closing Summary:

We will make an effort to increase our funded student cohort size to 10 which will make our total number of funded positions for the program to be 20 students. We can serve our undergraduate students better if we have 20 funded students in our program. We have around 23 sections of STAT/MATH 3379 and 19 sections of MATH 1342 each semester. We use our second-year teaching assistants to teach MATH 1342 and NO classes. Our graduate assistants help STATS 3379 students with SPSS (statistical programing) homework/projects in lab and tutoring. Having more graduate assistants will make a significant impact on the success of our undergraduate students.

A good number of excellent graduate students initially apply to our Statistics program, but many eventually decline after getting higher TA financial offers from more competitive Universities. Over time, this type of erosion obviously becomes a pronounced problem for any program. We have identified this as a serious issue for our program. We will continue to request the university to provide additional funding to overcome this problem. The current funding we provide them is not sufficient to pay the tuition fee and other expenses. This is encouraging them to join or transfer to other universities.

To provide our students the best skill needed to solve the real world problems, we are working on some changes in the program. As an initiation, we have changed our degree name to MS in Statistics and Data Science. We will work on the the course structures that provides more data analysis training to the students.

We will provide students with more professional development opportunities. Will continuously organize student weekly professional development sessions where the students make presentations in different statistical modeling projects. This is a great opportunity for them to learn how to present their research projects. We observed that our students benefited from it significantly so will continue to do this in the coming academic year as well.

We will continue to assign our second-year students to teach introductory statistics courses as instructors of record. We will continue to encourage our students to go through the PACE program graduate teaching perforation training certification. We also encourage our students to go through other professional development programs (Many are available online now).

The Comprehensive Exam does not disaggregate learning outcomes. Thus, the statistics faculty will consider doing so in the future and/or modifying the learning outcomes.

Department of Physics and Astronomy

Physics BS

Elevate the Reputation and Visibility of SHSU

Goal Description:

The Department seeks to elevate the reputation and visibility of SHSU by developing marketable skills that equip students for success in industry and the academy.

Providing Department: Physics BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Develop Core Mathematical Competencies in Applied Contexts

Learning Objective Description:

Lower division students will develop an interlinked network of quantitative skills in the context of physics and engineering applications. Skills to be addressed include algebra, trigonometry, vectors, logarithms and exponentials, polar coordinates, sinusoidal functions, complex numbers, matrices, differentiation, and integration.

RELATED ITEM LEVEL 2

First Year Physics Pre-Post Test

Indicator Description:

Students will complete a pre/post test in Physics 1411 assessing the common foundational concepts in Physics. Statistics will be collected on major, level of math coursework completed, and whether the Physics Bootcamp was completed.

Attached Files

1411_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The 1411 pre/post test was administered. Post-test comparison scores are not currently available due to international travel of the instructor.

Instead, we can report on another pre/post test in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination. Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 2

Incoming Student Mathematics Pre-Post Test

Indicator Description:

Students in the Physics Bootcamp will be given a pre/post test to assess mathematics readiness and progress made during the course. Two example exams are given, one focused on SAT level mathematics and the other on Caculus.

Attached Files

Math_Pretest.pdf

Calculus_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

A pre/post test was administered in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination. Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 1

Develop Experience in the Practice of Investigative Research

Learning Objective Description:

Upper division students will develop experience with research under the direct supervision of a faculty member.

RELATED ITEM LEVEL 2

Student Exposure to Research

Indicator Description:

The first indicator is inclusion of all Physics Majors and optionally also Astronomy Minors in a supervised research program. The second indicator is full participation in mentoring by the faculty.

Criterion Description:

Full participation by faculty and majors is expected.

Findings Description:

All students in the major (and most in the astronomy minor) have a research experience. A group of 8 research associates was taken to the conference on particle physics phenomenology at the University of Pittsburgh. All faculty have supervised research activities.

RELATED ITEM LEVEL 3

Action - Student Exposure to Research

Action Description:

Let students know about available research opportunities and establish projects they can contribute to at the undergraduate level.

RELATED ITEM LEVEL 1

Develop Higher-Order Critical Thinking Skills

Learning Objective Description:

Students at all levels will develop and demonstrate higher-order critical thinking skills, including a capacity to skillfully and creatively generalize techniques and principles to new contexts.

RELATED ITEM LEVEL 2

First Year Physics Pre-Post Test

Indicator Description:

Students will complete a pre/post test in Physics 1411 assessing the common foundational concepts in Physics. Statistics will be collected on major, level of math coursework completed, and whether the Physics Bootcamp was completed.

Attached Files

1411_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The 1411 pre/post test was administered. Post-test comparison scores are not currently available due to international travel of the instructor.

Instead, we can report on another pre/post test in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination. Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 2

Incoming Student Mathematics Pre-Post Test

Indicator Description:

Students in the Physics Bootcamp will be given a pre/post test to assess mathematics readiness and progress made during the course. Two example exams are given, one focused on SAT level mathematics and the other on Caculus.

Attached Files

Math_Pretest.pdf

Calculus_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

A pre/post test was administered in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination.

Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 2

Introductory Astronomy Pre-Post Test

Indicator Description:

A pre-post test will be administered in the introductory Astronomy courses to assess progress on relevant objectives.

Criterion Description:

Pre and post-test scores will be computed and tested for significant improvement against a p-value of 0.05 .

Findings Description:

A pre/post content survey was administered in Fall 2023 Stars & Galaxies course as well as the Spring 2024 Solar System course. A content survey of concepts covered throughout each course was administered the first week of class, and again the last day of class, both times unannounced. The purpose was to see what preconceptions students having coming into the course and find out how well they retain the information, without the aid of studying. Averages pre and post are listed for each section. A normalized gain is also calculated.

Fall 2023 (PHYS1403) Section 2

pre-test: 30%
post-test: 53%
normalized gain: .34 (medium gain)

Section 3

pre-test: 30%
post-test: 51%
normalized gain: .30 (medium gain)

Spring 2024 (PHYS1404) Section 2

pre-test: 33%
post-test: 50%
normalized gain: .27 (medium gain)

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 2

Upper Division Physics Pre-Post Test

Indicator Description:

Students in selected upper division courses will complete a pre/post test based on the Graduate Record Subject Exam in Physics. Examples are attached for PHYS 4370 (Classical Mechanics) and PHYS 4366 (Quantum Mechanics).

Attached Files

Quantum_Mechanics_A.pdf

Classical_Mechanics_A.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The upper division pre/post test was put on hold for one cycle, to resume subsequently.

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 1

Develop Marketable High-Demand Technical Skills

Learning Objective Description:

Students at all levels will develop and demonstrate skills valued in the workplace, such as mathematical sophistication, mental flexibility, trained intuition, capacity for abstraction, ability to independently and creatively solve problems, and experience working effectively on a team.

RELATED ITEM LEVEL 2

Development of Marketable Skills

Indicator Description:

Students will develop and demonstrate skills valued in the workplace, such as mathematical sophistication, mental flexibility, trained intuition, capacity for abstraction, ability to independently and creatively solve problems, and experience working effectively on a team.

Criterion Description:

A degree in physics opens a tremendous number of profitable career options because it develops marketable attributes and skills that employers are greatly interested in, such as mental flexibility, capacity for critical thinking, abstraction and generalization, training in creative problem solving, intuition for mechanical and electrical systems, and proficiency in advanced mathematics, data analysis, and computer applications (including programming).

These skills are developed throughout the degree program, starting with the Physics Bootcamp, which specifically addresses a majority of these marketable qualifications. Mathematical sophistication is developed through pedagogical exposure to the topics describe elsewhere, with extensive opportunities (recitation and homework) for self and team-based practice. Mental flexibility is encouraged by revisiting topics from multiple perspectives, by opportunities for peer-mentoring (where students may share distinct approaches), and by expressly furthering a recognition that any given problem can potentially be solved in a large variety of correct ways. Physical and mathematical intuition represents a bank of experience, refined by persistently comparing outcomes to expectations; thus, it may be usably projected onto new circumstances which resonate with those previously encountered. It is developed here by examples selected to build sensitivity to recurring patterns of thought, approaches to problem solving, and properties of natural law in the student's mind. Many such examples are selected expressly for their naively counter-intiuitive character. Abstraction is developed via extensive symbolic manipulation, and elevation of maximally general laws and principles. Independent creative problem solving is developed through a carefully structured sequence of examples and challenges that incrementally build on recently acquired skills,

requiring students to visualize and implement compound (multi-step) procedures in order to predict an outcome or design an optimized treatment. Teamwork is developed in collaborative small-group practice sessions.

Mathematical sophistication and capacity to independently solve problems is very directly assessed by performance in exams, assignments, and weekly group problem-solving recitations. Mental flexibility, intuition, and capacity for abstraction likewise indirectly manifest themselves on assignments and tests, especially components of those exercises specifically designed to challenge students in the application of skills and techniques to novel contexts. They are also be assessed by dialog with students during instructional periods, including student polling, with opportunities to reflect and redirect based on feedback from the instructor and/or peers. Team performance is self and group assessed during the recitations. It is also monitored by faculty and/or teaching assistants walking the tables to answer questions from each student group. In addition to the career insight fostered by direct exposure to the tools and techniques of physics and engineering, the Bootcamp seeks to expose students to more advanced aspects of life as a physicist or engineer. One form for this interaction is research or professional presentations by invited departmental guests (or similar online events), where students may be required to submit a summary of the talk and their impressions. In the case of on-campus events, students also have the opportunity to ask the guest directly about their work and seek advice on pathways into similar career opportunities.

Findings Description:

We have had multiple opportunities for career specialists in the space sector, national labs, and academic research to visit with students and communicate how skills developed in the classroom translate to a career. Students have submitted written essays about how they expect to use these skills in their careers. Team work has been developed in labs. Computer and analysis sophistication has been developed in research. Mathematical sophistication has been developed in the classroom and validated on exams.

RELATED ITEM LEVEL 3

Expand Redesign of the Conceptual Physics Course

Action Description:

Roll out the program to the online courses and deal with challenges associated with the lab.
Refine the course in response to student feedback.

RELATED ITEM LEVEL 1

Develop Mastery Of Fundamental Principles In Physics

Learning Objective Description:

Students at all levels will be exposed to the fundamental laws of nature and understand how a small set of principles govern and relate an incredible variety of phenomena in real-world contexts.

RELATED ITEM LEVEL 2

First Year Physics Pre-Post Test

Indicator Description:

Students will complete a pre/post test in Physics 1411 assessing the common foundational concepts in Physics. Statistics will be collected on major, level of math coursework completed, and whether the Physics Bootcamp was completed.

Attached Files

1411_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The 1411 pre/post test was administered. Post-test comparison scores are not currently available due to international travel of the instructor.

Instead, we can report on another pre/post test in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination. Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 2

Upper Division Physics Pre-Post Test

Indicator Description:

Students in selected upper division courses will complete a pre/post test based on the Graduate Record Subject Exam in Physics. Examples are attached for PHYS 4370 (Classical Mechanics) and PHYS 4366 (Quantum Mechanics).

Attached Files

Quantum_Mechanics_A.pdf

Classical_Mechanics_A.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The upper division pre/post test was put on hold for one cycle, to resume subsequently.

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 1

Develop Skills in Applied and Creative Problem-Solving

Learning Objective Description:

Students at all levels will learn to combine physical reasoning with mathematical computation in order to creatively solve real world problems and make predictions for measurable outcomes.

RELATED ITEM LEVEL 2

First Year Physics Pre-Post Test

Indicator Description:

Students will complete a pre/post test in Physics 1411 assessing the common foundational concepts in Physics. Statistics will be collected on major, level of math coursework completed, and whether the Physics Bootcamp was completed.

Attached Files

1411_Pretest.pdf

Criterion Description:

Students will show significant improvement between pre and post test, relative to the standard deviation of scores. A quarter point will be deducted per incorrect response (out of five multiple choice selections) so that the expected score for guessing is a zero.

Findings Description:

The 1411 pre/post test was administered. Post-test comparison scores are not currently available due to international travel of the instructor.

Instead, we can report on another pre/post test in the summer bridge program (STEM Catapult) related to the Physics Bootcamp program. The pre/post test consisted of 20 questions which were aligned with course coverage but independent of the actual material used for instruction and examination. Deducting a 1/4 point for incorrect responses, the corrected averages for the pre/post test were 3.2 and 5.7, with an increase of 2.5 points (a factor of 1.8 improvement).

RELATED ITEM LEVEL 3

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The upper division pre/post test was put on hold for one cycle, to resume subsequently.

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

Expand Our Service to the State and Beyond

Goal Description:

The Department seeks to expand its service to the state and beyond by promoting science appreciation in the general population and offering innovative credentialing tracks supporting high-value careers.

Providing Department: Physics BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Expand and Promote Appreciation for the Methods and Progress of Science

Learning Objective Description:

Students in core science and introductory courses will be instructed in the methods and successes of scientific approaches to understanding the world.

RELATED ITEM LEVEL 2

Introductory Astronomy Pre-Post Test

Indicator Description:

A pre-post test will be administered in the introductory Astronomy courses to assess progress on relevant objectives.

Criterion Description:

Pre and post-test scores will be computed and tested for significant improvement against a p-value of 0.05 .

Findings Description:

A pre/post content survey was administered in Fall 2023 Stars & Galaxies course as well as the Spring 2024 Solar System course. A content survey of concepts covered throughout each course was administered the first week of class, and again the last day of class, both times unannounced. The purpose was to see what preconceptions students having coming into the course and find out how well they retain the information, without the aid of studying. Averages pre and post are listed for each section. A normalized gain is also calculated.

Fall 2023 (PHYS1403) Section 2

pre-test: 30%
post-test: 53%
normalized gain: .34 (medium gain)

Section 3

pre-test: 30%
post-test: 51%
normalized gain: .30 (medium gain)

Spring 2024 (PHYS1404) Section 2

pre-test: 33%
post-test: 50%
normalized gain: .27 (medium gain)

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 1

Expand and Promote Appreciation for the Wonder of the Natural World

Learning Objective Description:

Students in introductory and core science courses will be exposed to the magnificence and order of the natural world.

RELATED ITEM LEVEL 2

Introductory Astronomy Pre-Post Test

Indicator Description:

A pre-post test will be administered in the introductory Astronomy courses to assess progress on relevant objectives.

Criterion Description:

Pre and post-test scores will be computed and tested for significant improvement against a p-value of 0.05 .

Findings Description:

A pre/post content survey was administered in Fall 2023 Stars & Galaxies course as well as the Spring 2024 Solar System course. A content survey of concepts covered throughout each course was administered the first week of class, and again the last day of class, both times unannounced. The purpose was to see what preconceptions students having coming into the course and find out how well they retain the information, without the aid of studying. Averages pre and post are listed for each section. A normalized gain is also calculated.

Fall 2023 (PHYS1403) Section 2

pre-test: 30%
post-test: 53%
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Section 3

pre-test: 30%
post-test: 51%
normalized gain: .30 (medium gain)

Spring 2024 (PHYS1404) Section 2

pre-test: 33%
post-test: 50%
normalized gain: .27 (medium gain)

RELATED ITEM LEVEL 3

Continue Improving Assessment Materials

Action Description:

Implement instrument developed with the STEM center for the Catapult program more broadly.

RELATED ITEM LEVEL 1

Expand and Promote Credentialed Tracks in Astronomy

Performance Objective Description:

The Department seeks to expand student pathways in Astronomy with a new Astronomy Minor, supporting graduate study and careers in sectors such as space science and education.

RELATED ITEM LEVEL 2

Expand and Promote Astronomy Minor

KPI Description:

The Astronomy Minor has been approved, with students registered and courses offered.
Subsequently, the program will be assessed for rate of enrollment, rate of completion, and student outcomes including progress toward graduate study or employment in an associated career.

Target Description:

See at least 10 students enrolled in upper division astronomy courses associate with the minor, and offer each upper-division course once per year.

Results Description:

This goal has been met and we look forward to expanding further.

RELATED ITEM LEVEL 3

Action - Expand and Grow Astronomy Minor

Action Description:

Resume operation of the advanced astronomy courses in Fall 2025 and initiate a new 1-hour seminar to close the "gap" in the 18-hour curriculum.

RELATED ITEM LEVEL 3

Create new 1-hour Astronomy Seminar Course

Action Description:

Add course to the catalog to "close the gap" in the 18 hour curriculum.

RELATED ITEM LEVEL 1

Expand and Promote Credentialed Tracks in Engineering and Applied Physics

Performance Objective Description:

The Department seeks growth in the Pre-Engineering 2+2 tracks, as well as the dual degree Physics / Pre-Engineering track, and provide opportunities for students in applied physics. The performance objectives are increased enrollment and successful graduations / transfers.

RELATED ITEM LEVEL 2

Promote Tracks in Pre-Engineering

KPI Description:

The performance indicator will be growth in the number of students declaring a Pre-Engineering Major (or participating in the dual degree program) and transitioning successfully to an accredited Engineering school. Graduates may be tracked after graduation to self-assess the quality of their preparation and to gather statistics on secondary outcomes.

Target Description:

See growth of at least 25% in registration for pre-engineering tracks in the first three years of assuming program supervision.

Results Description:

This goal has been substantially exceeded, and enrollment in the first semester Physics Bootcamp course has more than doubled, with significant registrations from pre-engineering and dual degree students.

RELATED ITEM LEVEL 3

Action - Promote Tracks in Pre-Engineering

Action Description:

Partner with UT Tyler to reformalize the articulation agreement and update the catalog.

RELATED ITEM LEVEL 1

Expand and Promote Credentialed Tracks in Physics and Astronomy Education

Performance Objective Description:

The Department seeks to partner with the College of Education to promote careers in science education and to equip students pursuing those careers with a suitable combination of core science competencies and pedagogical methods. The performance objectives are increased graduation rates, job placement, and career longevity.

RELATED ITEM LEVEL 2

Promote Tracks in STEM Education

KPI Description:

The performance indicator will be growth in the number of students enrolled in STEM education tracks with a (second) Major in Physics or a Minor in Astronomy. Graduates may be tracked after graduation to self-assess the quality of their preparation and to gather statistics on career longevity.

Target Description:

Reach agreement with Education Department on partnering to increase interest in this degree combination by Fall 2024.

Results Description:

Efforts have progressed on an agreement, but the agreement is not yet finalized. This goal remains pending.

RELATED ITEM LEVEL 3

Action - Promote Tracks in STEM Education

Action Description:

Partner with the education department to establish a degree plan for future teachers.

RELATED ITEM LEVEL 3

Expand Redesign of the Conceptual Physics Course

Action Description:

Roll out the program to the online courses and deal with challenges associated with the lab.
Refine the course in response to student feedback.

RELATED ITEM LEVEL 1

Expand and Promote Tracks Leading to Graduate Study in Physics

Performance Objective Description:

The Department seeks to expand pathways for students interested in continuation to graduate programs in Physics and Astronomy. The performance objectives are increased applications, acceptances, and degree completions.

RELATED ITEM LEVEL 2

Promote Continuation to Graduate Study

KPI Description:

The performance indicator will be growth in the number of students with a Major in Physics or a Minor in Astronomy proceeding to PhD and Masters programs. Graduates may be tracked after graduation to self-assess the quality of their preparation and to gather statistics on secondary outcomes.

Target Description:

See at least 1/3 of graduates applying for post-secondary education.

Results Description:

We are meeting the goal for applications to graduate study.

RELATED ITEM LEVEL 3

Action - Promote Continuation to Graduate Study

Action Description:

Take students to conferences, advertise application dates, and partner with faculty at programs that are accepting students.

RELATED ITEM LEVEL 3

Create new 1-hour Astronomy Seminar Course

Action Description:

Add course to the catalog to "close the gap" in the 18 hour curriculum.

Prioritize Student Success and Student Access

Goal Description:

The Department seeks to prioritize student success and student access by providing accessible educational pathways matched to high-value careers and mitigating achievement gaps.

Providing Department: Physics BS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Capitalize on Improved Accessibility and Reach for the Physics Bootcamp

Performance Objective Description:

The Department has successfully expanded the reach and accessibility of the Physics Bootcamp through inclusion in the University Core Science curriculum. Next, we must capitalize on this with effective marketing to students and departments who can benefit from this initiative.

RELATED ITEM LEVEL 2

Expand and manage enrollment in the Physics Bootcamp

KPI Description:

After successful inclusion of Physics Bootcamp in the Core Science Curriculum, the next indicator is enrollment growth and management of that growth.

Target Description:

Expand enrollment to at least 25 students per spring and fall semester, and manage possible expansions of course sections if this enrollment consistently reaches a level of 40 or more students.

Results Description:

This goal has been exceeded, with close to (or above) 30 students enrolled for the upcoming and two prior terms.

RELATED ITEM LEVEL 3

Action - Capitalize on inclusion of Physics Bootcamp in Core Curriculum

Action Description:

The bootcamp enrollment has doubled. We will plan to complete the associated textbook (Walker/Dent), publicize the course, and refine the student experience.

RELATED ITEM LEVEL 1

Provide Efficient Pathways for Students Who Arrive Near-to-Calculus-Ready

Performance Objective Description:

The Department seeks to efficiently transition students who arrive near calculus-ready into successful coenrollment in Physics I and Calculus I during their first semester at SHSU through expansion of the summer bridge program and partnerships with the department of mathematics and statistics, as well as the STEM center. The performance objective is improvement in the pass rate coupled with acceleration of the degree plan.

RELATED ITEM LEVEL 2

Introduce Summer Bridge Program and Common First Year in STEM

KPI Description:

The first indicator will be initiation of the programs. Subsequently, the summer bridge will be assessed for enrollment, and progress of participants will be assessed using pre-post testing. Their subsequent outcomes in the first year STEM experience at SHSU may also be compared against a control group, correcting for other educational and preparatory differences.

Target Description:

Successfully operate a first trial of the bridge program in July 2023, with at least 15 students enrolled.

Results Description:

The STEM bootcamp was operated in conjunction with the STEM center and the department of Math and Statistics. It was an success, with more than 15 students enrolled and several fast-tracked for more advanced coursework in the following term.

RELATED ITEM LEVEL 3

Complete First Offering of the Summer Bridge and Common First Year Experience

Action Description:

Find a funding mechanism to renew this course in future summers (external, Federal preferred).

RELATED ITEM LEVEL 1

Provide Flexible Pathways for Students With Broad Interests in STEM

Performance Objective Description:

The Department seeks provide students with general interest in various STEM disciplines an opportunity to complete a common first year experience that samples various possibilities without sacrificing credit or degree progress.

RELATED ITEM LEVEL 2

Introduce Summer Bridge Program and Common First Year in STEM

KPI Description:

The first indicator will be initiation of the programs. Subsequently, the summer bridge will be assessed for enrollment, and progress of participants will be assessed using pre-post testing. Their subsequent outcomes in the first year STEM experience at SHSU may also be compared against a control group, correcting for other educational and preparatory differences.

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Successfully operate a first trial of the bridge program in July 2023, with at least 15 students enrolled.

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The STEM bootcamp was operated in conjunction with the STEM center and the department of Math and Statistics. It was an success, with more than 15 students enrolled and several fast-tracked for more advanced coursework in the following term.

RELATED ITEM LEVEL 3

Complete First Offering of the Summer Bridge and Common First Year Experience

Action Description:

Find a funding mechanism to renew this course in future summers (external, Federal preferred).

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

The Department seeks to grow enrollment in several targeted academic tracks, including STEM Education, Pre-Engineering, and Astronomy, while also increasing the number of Physics majors progressing to graduate study.
The Department seeks to develop marketable technical skills, with a focus on the promotion of critical thinking, abstract reasoning, mathematical sophistication, physical intuition, creative problem solving, and teamwork.

The Department seeks to promote student success with expansion of the Physics Bootcamp, development of a summer bridge program for students who are near calculus-ready, and initiation of a common first year program for quantitative STEM tracks.

The Department seeks to promote appreciate for the progress of science and the majesty of the natural world.

The department seeks to improve outreach and advertisement, including by further improvements to the website, including video student testimonials.

Update of Progress to the Previous Cycle's PCI:

Enrollment in the major courses at the front of the degree (Bootcamp, PHYS 1, PHYS 2) was close to doubled.

A successful model of the summer bridge program was instructed.

Better communication with the advising center led to improved awareness of our programs among students.

Students were integrated into research and the department was recognized at the annual Pheno conference in Pittsburgh (for leadership in undergraduate research inclusion).

New Plan for Continuous Improvement

Closing Summary:

We will formalize the continuation of the articulation agreement with UT Tyler and update the catalog.

We will continue to partner with advising and the visitor center to get relevant information to students.

We will continue to lead in undergraduate research inclusion.

We will promote the Physics Bootcamp curriculum to a national (and international) audience ahead of the book release.

We will emphasize marketable skills that are developed by our degree program.