

**NORTH CAROLINA AGRICULTURAL AND TECHNICAL
STATE UNIVERSITY**

**Program Assessment and Improvement Report
Department of Built Environment
Bachelor of Science in Environmental Health and Safety**

There are thirteen full-time tenure and non-tenure faculty that deliver 3 programs (and Certificate in OSH) in the Built Environment Department. Specifically, there are now three full-time tenure track faculty that deliver the **BS in Environmental Health and Safety (EHS) Program** along with the assistance of three-four adjunct faculty each semester. Located in the College of Science and Technology, the EHS program follows university's guidelines for assessing educational programs.

1. Expected Program Outcomes for the Educational Program and Its Student Learning Outcomes: Summary

a. Program Outcomes

- (1) **Program Quality.** The BS degree program in Environmental Health and Safety will achieve excellence and recognition for high quality in teaching and learning, including the achievement of national accreditation. (A&T Strategic Goals 2, 3, and 6)
- (2) **Program Productivity.** The BS degree program in Environmental Health and Safety will meet or exceed the University's goals for research/creative productivity, enrollment, retention, degree completion, and placement of graduates in jobs or graduate education. (A&T Strategic Goal 6 and vision for making a significant difference in the lives of those we educate)
- (3) **Program Contributions to Community Engagement.** The BS degree program in Environmental Health and Safety will contribute appropriately to intellectual climate and creative exchange, professionalism, civic engagement, inclusiveness, cultural awareness, and respect for diversity. (A&T Strategic Goals 1, 2, 4, and 5)

b. Student Learning Outcomes

- (1) **Communication Skills.** Students completing the BS degree program in Environmental Health and Safety will exhibit effective communication skills (written, oral, graphic and interpersonal) appropriate for professionals in this field of study at the bachelor's level.
- (2) **Critical Thinking Skills.** Students completing the BS degree program in Environmental Health and Safety will effectively use quantitative and/or qualitative analytical problem-solving skills appropriate for professionals in this field of study at the bachelor's level.
- (3) **Disciplinary Expertise.** Students completing the BS degree program in Environmental Health and Safety will demonstrate a level of discipline-specific expertise (knowledge, skills, and professionalism) appropriate for professionals in this field of study at the bachelor's level.
- (4) **Research/Creative Engagement.** Students completing the BS degree program in Environmental Health and Safety will demonstrate ability to engage productively in the

review and conduct of disciplinary research and creative professional activity appropriate for professionals in this field of study at the bachelor's level.

2. Analysis of Expected Program Outcomes Assessment-Details

(a) Program Outcomes

The overall program mission of Environmental Health and Safety at North Carolina Agricultural and Technical State University is to prepare men and women in the scientific, managerial, and supervisory areas required in Environmental Health and Safety. We encourage our students to use their educational experience and discipline-related knowledge to work productively and efficiently in their area of expertise as well as contributing to the safety and protection, welfare and quality of life of mankind and the community. The program will prepare students to function as professionals and be able to adapt to the ever-changing world of environmental health and safety.

To achieve our mission, purpose and focus the program has established program outcomes of quality, productivity and community engagement which will be discussed below, and the majority of these activities have been attained with the addition of three-full time tenure track faculty: Dr. Dongyang Deng, Dr. Emmanuel Obeng-Gyasi and Dr. Alesia Ferguson (Current Chair of the Department) 2018-2019.

The three program outcomes for the BS in Environmental Health and Safety are summarized in **Table 1**, showing the relationship between the outcomes, the assessment, the results, and the improvements made. A more detailed narrative follows the table.

Table 1: Program Outcomes, Assessments, and Improvements, 2017-2020

Name of Program	Program Outcome	Method of Assessment	Results of Assessment	Use of Assessment Results for Improvement
	<p>Program Quality. The BS degree program in Environmental Health and Safety will achieve excellence and recognition for high quality in teaching and learning, including the achievement of national accreditation. (A&T Strategic Goals 2, 3, and 6)</p>	<p>This outcome will be measured by looking at any steps taken to acquire national accreditation and other recognitions.</p>	<p>The EHS program achieved ABET accreditation in Spring 2019. EHS was recognized as a Qualified Academic Program (QAP) I 2019</p>	<p>The faculty engaged in substantial structural change to the EHS curriculum, prior to receiving ABET accreditation and QAP recognition in 2019. Changes in prerequisites are being made along with course improvements.</p>

BS in Environmental health and Safety	<p>Program Productivity. The BS degree program in Environmental Health and Safety will meet or exceed the University's goals for research/creative productivity, enrollment, retention, degree completion, and placement of graduates in jobs or graduate education. (A&T Strategic Goal 6 and vision for making a significant difference in the lives of those we educate)</p>	<p>The assessment measure will be the number of full –time research faculty added, grants submitted, grants obtained, number of publication, and presentations. Data for enrollment, degree completion and job placement will be analyzed</p>	<p>Faculty Productivity There was recognition that the program needed full time faculty to achieve the productivity outcome given minimal research and publications before 2017, and lack of full-time faculty in the program. Student Productivity Student numbers continue to be relatively steady over the last three years</p>	<p>Faculty Productivity Three new full time tenure track faculty were added (2 in Fall 2017) and 1 in Fall 2018) to increase program productivity in the areas of research, publication, and in the delivery of student learning. Student Productivity Over the last year there is a slight drop in enrollment number: Measures are being taken: see below.</p>
	<p>Program Contributions to Community Engagement. The BS degree program in Environmental Health and Safety will contribute appropriately to intellectual climate and creative exchange, professionalism, civic engagement, inclusiveness, cultural awareness, and respect for diversity. (A&T Strategic Goals 1, 2, 4, and 5)</p>	<p>This will be measured by the diversity of faculty and their broad contributions to the science community, and community at large.</p>	<p>EHS faculty is well diversified, along with the student body and contribute to community in significant ways while maintaining respect and professionalism.</p>	<p>Each year faculty are evaluated for research, service and teaching. It was determined that adequate service was demonstrated. Activities are entered into the University Digital measures platform and documented in faculty folder. Engaging with our Advisory Board is a key activity</p>

1. **Program Quality.** The BS degree program in Environmental Health and Safety will achieve excellence and recognition for high quality in teaching and learning, including the achievement of national accreditation. (A&T Strategic Goals 2, 3, and 6)

The EHS program has been retroactivity accredited by ABET (<https://www.abet.org/about-abet/>) from October 1, 2017 to September 2021 under the applied and natural science standards. ABET assures “a program meets quality standards that produces graduates prepared for the global workforce” (<https://www.abet.org/about-abet/>). The EHS program demonstrated that they were able to achieve

the ABET student learning outcomes (SLO) (a) through (k) across the curriculum and in providing students quality teaching and learning (ABET report can be provided). This national accreditation makes us proud, but allows us to look at avenues for improvement. The EHS program has implemented new changes to prerequisites to allow students to better transition through new curriculums. The EHS program has also implemented stricter controls over advising by faculty members. The program now checks students in the EHS 498 to ensure they are seniors and have completed majority of EHS major courses. New curriculums were approved by the Provost in 2018 and implemented in Fall 2019. Curriculums are available at <https://www.ncat.edu/cost/departments/built-environment/academic-programs/environmental-health-and-safety.php>. The two new curriculums include a Science and a Management track, allowing the students some flexibility in other science (e.g., Introduction to Environmental Science) and waste management courses (e.g., Environmental Ethics) outside of the department. New major courses have also been added to the curriculum to reflect education and job needs: Environmental Risk Assessment, Environmental and Occupational Toxicology, Environmental Management, etc.), which were approved and developed for online teaching (last development occurs Summer 2020).

The B.S. degree in Environmental Health and Safety is also accredited by the Association of Technology, Management, and Applied Engineering (ATMAE). Additionally, the EHS program was recently recognized as a Qualified Academic Program (QAP) by the Board of Certified Safety Professional (BCSP) enabling graduates to become Graduate Safety Professionals (GSP) upon completion of degrees. ATMAE was received in 2016 and BCSP recognition was received in May 2019. Graduates of our program can now forgo the Associate Safety Professional® (ASP®) exam to sit for the Certified Safety Professional® (CSP®) exam after requisite experience is acquired. It is only available to SH&E graduates from degree programs which meet BCSP QAP standards.

2. **Program Productivity.** The BS degree program in Environmental Health and Safety will meet or exceed the University's goals for research/creative productivity, enrollment, retention, degree completion, and placement of graduates in jobs or graduate education. (A&T Strategic Goal 6 and vision for making a significant difference in the lives of those we educate)

- I. **Research/Creative Productivity**

This outcome is measured by the level of scholarly productivity of the faculty. Prior to 2017-2018, the program relied entirely on adjunct faculty that did not contribute to the scholarly productivity of the program. Table 2 reflects the publication and grant work in the program as a result of the 3 added full-time faculty. Year 2018-2019 for example, faculty had 14 publications in peer-reviewed journal and 20 presentations at recognized conferences around the country. Faculty have applied for a significant amount of grants and have been successful on some smaller grants. Year 2018-2019 saw for example funding of \$354,000). Other scholarly activities include workshops and professional development which in turn also contributes to program outcome of 3) of community engagement. Other scholarly activities include invited talks, and engagement activities for example

Table 2: Research and Creative Productivity

Productivity Measure/Year	2016-2017	2017-2018	2018-2019	2019-2020
Publications	NA	5	14	11
Conference Presentation	NA	7	20	21
Other Scholarly activities	NA	18	15	20

Submitted Grants (#/\$)	NA	12(\$100,00)	20 (\$527,000)	11 (\$2,800,000)
Funded Grants	NA	1 (\$12,974)	3) (\$354,000)	4 (\$101,000)

Faculty now have research labs associated with the program: Dr. Dongyang Deng: Water Quality Analysis Lab-JSNN Lab 106 and Dr. Emmanuel Obeng-Gyasi- Environmental Health and Disease Lab- Hines Hall 313. Dr. Ferguson has a research office for Modeling Activities: Price 115. Within these labs, various faculty have engaged undergraduate and graduate students in research.

II. **Enrollment, Retention, Degree Completion and Placement of Graduates**

Enrollment, Retention, Degree Awarded Data can be found in Table 3. Retention and Persistence Data is represented at the Department Level and is not disaggregated. Enrollment in the EHS program has remained very consistent with a spike in enrollment for Fall 2017. Degrees awarded in 2017-2018 and 2018-2019 saw a substantial increase over 2016-2017, and we expect a similar graduation rate for the 2019-2020 year following the summer session 2020. The majority of the EHS students are online (80%), and the online program continues to be our focus. Every effort is made to ensure online and in-class students receive the same quality of education.

Table 3: Student Productivity Data- Enrollment, Degrees Awarded, Retention and Persistence

Enrollment	Fall 2016	Fall 2017	Fall 2018	Fall 2019
Environmental Health and safety	54	66	56	50
Degrees Awarded	2016-2017	2017-2018	2018-2019	Just Fall 2019
Environmental Health and safety	9	15	15	4
Department Retention				
Yr 1	78.6	77.0	79.4	
Yr 2	69.4	69.7		
Yr 3	64.3			
Department Persistence				
Yr 1	81.8	55.6	61.5	
Yr 2	54.5	44.4		
Yr 3	54.5			

Enrollment and degree completion can be affected by access to general education courses. We have found that access to online chemistry and physics courses has caused a delay in degree completion. It has also caused some students to be discouraged and leave the program. In the past many student would seek these courses through the UNC online system, however these courses are not always available. In Fall 2019 a special effort was made to reach out to inactive students in the program. We are hoping enrollment increases for Fall 2020. In addition, special effort has been made through the online management team at NCAT to ensure these courses will be offered online in Fall 2020. Recruitment will take a more aggressive approach by engaging more high school and community colleges (developing articulation agreement), providing more tours and engaging at the schools.

The EHS program is able to place students at highly recognized companies such as International Paper, Amazon, Kellogg, Dow Corning, Owens Corning, Toyota, Miller Brewing, Caterpillar,

Kmart Warehousing, John Deere Golf Course Division, City of Winston-Salem, Federal OSHA, NC OSHA, DOT, Cone Hospital. General Motors, Greensboro Fire Department, City of Tarborough, John Deer Lawn and Gardening, NCAT Environmental and Safety Office over the last few years. In a first destination survey ran by the University, 90 days out from graduation, in August 2019, shows that of the 8 student graduating 2018-2019, 75% had jobs lined up before graduation, 1 was seeking and 1 was not seeking. 2019-2020 will be available soon.

- 3) Program Contributions to Community Engagement.** The BS degree program in Environmental Health and Safety will contribute appropriately to intellectual climate and creative exchange, professionalism, civic engagement, inclusiveness, cultural awareness, and respect for diversity. (A&T Strategic Goals 1, 2, 4, and 5)

With the addition of three full time faculty, there has been a significant increase in the number of service (community, department, college, university activities) associated with the program, that contributes to intellectual climate and creative exchange in a manner that is inclusive and respects diversity. Only a small fraction of highlights are made here. The three full time faculty are diverse (two females, two blacks, one Chinese). All faculty members are reviewers for multiple journals with over 5 reviews performed by each per year (e.g., Journal of Environmental Engineering, Journal of Exposure Science and Environmental Epidemiology). One faculty is an Associate Editor for two top journals (e.g., International Journal of Environmental Research and Public Health). One faculty sits on the Federal Environmental Protection Agency Board for Human Subjects Review Board (HSRB) overseeing pesticide related studies. All faculty provide service to the University (e.g., tri-chair graduation committee) and all faculty play a part in recruiting event and engaging with students, judges in various national and local student competitions (e.g., MATHCOUNTS competition, 2020 NSF Graduate Research Fellowship Program). One faculty also participates in the mentoring of underrepresented males at NCAT.

EHS faculty have also recently added graduate courses to the Applied Science and Technology (AsT) PhD general track program in the College of Science and Technology. The EHS program is a part of a larger department, therefore EHS faculty contribute to the development of curriculum in the CM and GEOM programs. Many of the grants submitted and funded are collaborative activities with other colleges and universities (e.g., University of Virginia, University of Miami). EHS meets with an EHS advisory Board twice a year and engages them on courses, curriculum changes and student activities.

b) Student Learning Outcomes

The three student learning outcomes for the BS in EHS program are summarized in **Table 4**, showing the relationship between the outcomes, the assessment and results, and the improvements made. More detailed narrative follows the table. For years 2018-2020 (Fall 2020 data available to date) the EHS 498: Industrial Experience in the senior year (sometimes referred to as Experiential Learning) has been used to evaluate our 4 SLO's given its comprehensive nature and reliance on previous EHS courses. ABET SLO outcomes were previously used for comparison against the SACs SLO's for 2017-2018 and in comparison to previous performance in 2012 (Figure 1). Overall thresholds were set at 2.8/4.0 for performance for all ABET SLO/s in 2017-2018.

Table 4. Student Learning Outcomes, Assessments, and Improvements

Name of Program	Program Outcome	Method of Assessment	Results of Assessment	Use of Assessment Results for Improvement
BS in EHS	<p>Communication Skills. Students completing the BS degree program in Environmental Health and Safety will exhibit effective communication skills (written, oral, graphic and interpersonal) appropriate for professionals in this field of study at the bachelor's level.</p>	<p>i. Evaluated in 2017-2018 Using ABET SLO G across multiple courses (variable rubrics) ii. Evaluated in 2018-2020 in EHS 498. For final presentation, students will be evaluated on a rubric which will judge their written and oral communication skills on their slides and written reports (final and monthly).</p>	<p>Communication has always been a strength of the EHS program during all assessment periods. i. 2017-2018: ABET score- 3.84/4.00 (meets objective) ii. Assessed during the 2018/2019 academic year: the students met the standard of 80 percent attaining the communication objectives with a score of 80% or better.</p>	<p>Change in courses being evaluated for SACs to EHS 498 in 2018. EHS 498: The students have always surpassed the required threshold, even on previous ABET evaluations. Efforts to maintain this have been implemented by ensuring the high standards and drawing on previous skills.</p>
	<p>Critical Thinking Skills. Students completing the BS degree program in Environmental Health and Safety will effectively use quantitative and/or qualitative analytical problem-solving skills appropriate for professionals in this field of study at the bachelor's level.</p>	<p>i. Evaluated in 2017-2018 Using ABET SLO B across multiple courses (variable rubrics) ii. Evaluated in 2018-2020 in EHS 498. Students will be able to demonstrate critical thinking skills in their reflection on discipline specific activities they are performing through monthly and final reports.</p>	<p>i.2017-2018; ABET Score 3.1/4.0. (meets objective-not high) ii.2018-2020: Critical thinking was a problem in the program 2018-2019, with only 50 % of the students meeting the objective of scoring 80%. 2019-2020:80 percent of students scoring 80% or better was met both years.</p>	<p>Change in courses being evaluated for SACs to EHS 498 in 2018 Students not meeting the critical thinking objective was addressed for 2019-2020 to increase scores. Interventions: e.g., more activity on the discussion board, detailed email reminders</p>
	<p>Disciplinary Expertise. Students completing the BS degree program in Environmental Health and Safety will demonstrate a level of discipline-specific expertise (knowledge, skills, and professionalism) appropriate for professionals in this field of study at the bachelor's level.</p>	<p>Evaluated in 2017-2018 Using ABET SLO K across multiple courses (variable rubrics) Evaluated in 2018-2020 in EHS 498. Students will be able to demonstrate various EHS activities through competencies (e.g., standards/regulations, safety instructions, field training).</p>	<p>i. 2017-2018: ABET Score 3.4/4.0 (meets objective) ii. 2018-19 demonstrated that only 67 percent of students achieved an 80 percent or better. 2019-2020: 80 percent of students attain a score of 80 or better for Fall 2020.</p>	<p>Changes in course being evaluated from a total score against multiple courses to EHS 498 in 2018 Disciplinary expertise was previously a problem in the EHS 498. Improvements made in student understanding of requirement. Promoting student understanding of how to apply and interpret EHS discipline during their experiential education course.</p>
	<p>Research/Creative Engagement. Students completing the BS degree program in Environmental Health and Safety will demonstrate ability to engage productively in the review and</p>	<p>Evaluated in 2017-2018 Using ABET SLO C across multiple courses (variable rubrics). Evaluated in 2018-2020 in EHS 498: Clear evidence of participation in various</p>	<p>i.2017-2018: ABET Score: 3.73/4.0 (meets objective) ii. 2018-2020: 80 percent of students have attained a score of 80 or better both years</p>	<p>Changes in course being evaluated from a total score against multiple courses to EHS 498 after 2017-2018 Even though the SLO of research and creative</p>

	conduct of disciplinary research and creative professional activity appropriate for professionals in this field of study at the bachelor's level.	EHS activities which demonstrate research and creative engagement with field mentors. Students also write a reflective conclusion in final report.		engagement was met, faculty feel that creative engagement with mentors in the field can be better assessed and are discussing alternative courses or measures.
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Figure 1: Cumulative Performance of students across multiple courses meeting ABET A-K SLO's

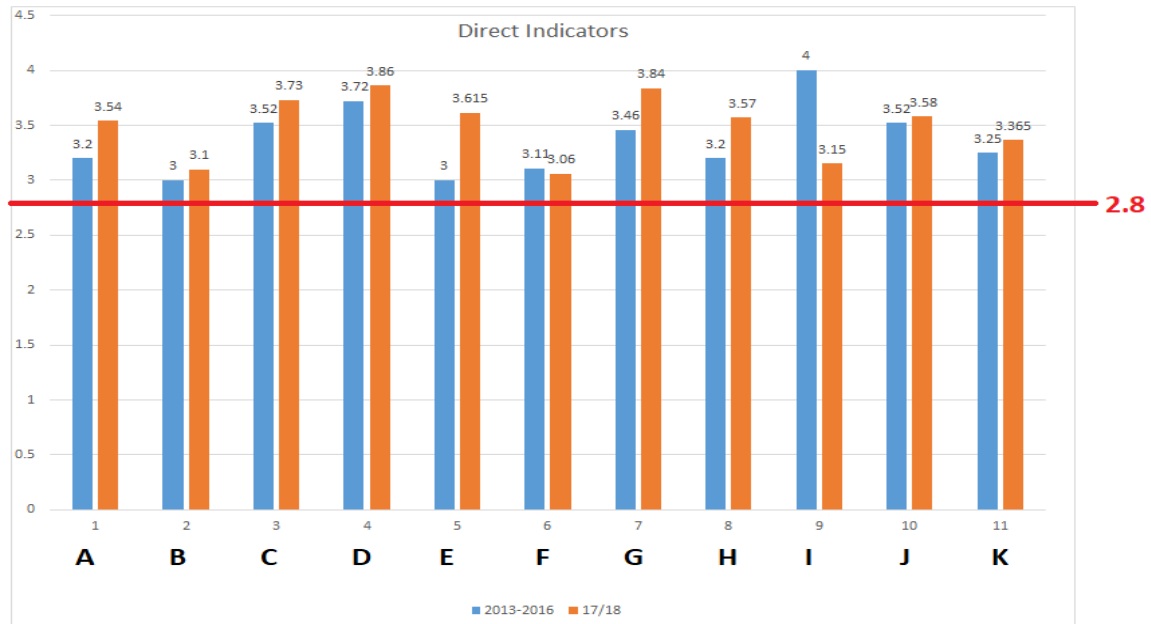


Figure 2: ABET SLO's matched to SACs SLO's for 2017-2018 Data

ABET SLO's	Matching SAC SLO's	Examples Courses Evaluated (assignment details- See ABET report)
(a) an ability to apply knowledge of mathematics, science, and applied sciences		
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	2) Critical	EHS 311, EHS 313
c) an ability to formulate or design a system, process, or program to meet desired needs	4) Research/ Creative Thinking	EHS 432
(d) an ability to function on multidisciplinary teams		
(e) an ability to identify and solve applied science problems		
(f) an understanding of professional and ethical responsibility		

(g) an ability to communicate effectively	1) Communication Skills	EHS 311, EHS 394, EHS 498
(h) the broad education necessary to understand the impact of solutions in a global and societal context		
(i) a recognition of the need for and an ability to engage in lifelong learning		
(j) a knowledge of contemporary issues		
(k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.	3) Disciplinary Expertise	EHS 313, EHS 394

- 1) **Communication Skills.** Students completing the BS degree program in Environmental Health and Safety will exhibit effective communication skills (written, oral, graphic and interpersonal) appropriate for professionals in this field of study at the bachelor's level.

The primary measures for this outcome was the presentation of the final portfolio in the EHS 498 course which is an Industrial experience/experiential education course in which students perform an internship in the field. They demonstrate their mastery of several areas within the EHS field and present that work through a final report and a final presentation. Oral and written communication skills are assessed using a rubric of performance across specific communication skills. The benchmark for this outcome was that a minimum score of 80% be achieved by 80% of the class. **Table 5** shows that the benchmark outcome was achieved over Fall 2019 to Fall 2018 (three evaluation periods). Success is in part due to this SLO being assessed in the Senior year following much practice across a series of EHS courses and monthly reports in EHS 498 and associated feedback points from instructor prior to final report. Before Fall 2018, performance on ABET SLO's were matched with SACs SLO with 96% performance measure.

Table 5: Performance in Communications—Percentage Meeting Benchmark

Academic Year	N	Communication
2017-2018	(evaluated across multiple courses for ABET): SLO G	96% (3.84/4.0): Performance measure
Fall 2018	3	100
Spring & Summer 2019	5	80%
Fall 2019	3	100%

- 2) **Critical Thinking Skills.** Students completing the BS degree program in Environmental Health and Safety will effectively use quantitative and/or qualitative analytical problem-solving skills appropriate for professionals in this field of study at the bachelor's level.

This outcome was assessed in the final report in EHS 498 for three periods from Fall 2018 to Fall 2019. A successful outcome was determined to be 80% of the students performing at 80% or better. Initially only 66.7 percent of the students were meeting the objective (Fall 2018) but improvements were implemented through interventions such as more activity in the discussion board and detailed email reminders about the value of the critical thinking portion of the rubric this section. This resulted in improved outcomes with more than 80 percent of students attaining an 80 percent or better score for Spring and Summer 2019 and Fall 2019 (**Table 6**). Before Fall 2018, performance on ABET SLO's were matched with SACs SLO with average 78% performance measure.

Table 6: Performance in Critical Thinking Skills

Academic Year	N	Percentage Meeting Benchmark Score
2017-2018	(evaluated across multiple courses for ABET): SLO B	78% (3.1/4.0): Performance measure
Fall 2018	3	66.67%
Spring & Summer 2019	5	80%
Fall 2019	3	100%

- 3) **Disciplinary Expertise.** Students completing the BS degree program in Environmental Health and Safety will demonstrate a level of discipline-specific expertise (knowledge, skills, and professionalism) appropriate for professionals in this field.

This outcome was measured using the final project report and presentation in EHS 498. It required students to demonstrate adequate mastery of a variety of EHS activities across competencies. The data presented in **Table 7** indicate that performance has improved from 66.67% meeting the benchmark of 100% meeting the benchmark of at least an 80 percent score or higher from Fall 2018 to Fall 2019. This is due to several factors, the largest being active faculty engagement in reminding students to address critical areas which will be assessed and understanding the value of applying competencies in the field. Students were encouraged to draw on their previous training in the field. Students were more closely monitored and examples were provided in “making the connection”. Competencies for example evaluated include use of EHS technical terms, application of standards and regulation to their particular industry, methods to provide health and safety training and evaluation in the field of critical needs and avenues for improvement. Before Fall 2018, performance on ABET SLO’s were matched with SACs SLO with 85% performance measure.

Table 7: Performance in Disciplinary Expertise Metric

Academic Year	N	Percentage Meeting Benchmark Score
2017-2018	(evaluated across multiple courses for ABET): SLO G	85% (3.4/4.0): Performance measure
Fall 2018	3	66.67
Spring & Summer 2019	5	100%
Fall 2019	3	100%

- 4) **Research/Creative Engagement.** Students completing the BS degree program in Environmental Health and Safety will demonstrate ability to engage productively in the review and conduct of disciplinary research and creative professional activity appropriate for professionals in this field of study at the bachelor’s level.

Creative engagement requires to students to look at new and old ways of engaging with their mentor in the field and applying previous knowledge where this class EHS 498 embodies engagement with critical partners. Research is always a challenge to truly integrate into coursework, however in writing the final report students are required to research where necessary applicable

standards and regulation that apply to that particular industry. In addition, 25 points are awarded the students to finalize the report through a reflective conclusion that allows for creativity and further research. Students have demonstrated the ability across all SLO's and draw on the ability to go beyond through creative thought and engagement (Table 8), with all student Fall 2018 through Fall 2019 meeting the benchmark of 80% or higher performing at 80% score. Before Fall 2018, performance on ABET SLO's were matched with SACs SLO with 93% performance measure.

Table 8: Performance in Research/Creative Metric

Academic Year	N	Percentage Meeting Benchmark Score
2017-2018 (abet performance indicator used)	(evaluated across multiple courses for ABET): SLO C	93% (3.73/4.0): Performance measure
Fall 2018	3	100%
Spring & Summer 2019	5	80%
Fall 2019	3	100%

3. Evidence of Program and SLO Improvements Using the Results of the Assessment (Closing the Loop)

Overall, program quality, productivity and contributions to community is significant. The EHS program is healthy with three very active faculty and adjuncts that contribute the program in a meaningful way. Enrollment and retention can continue to be improved as indicated below.

a. Program Outcomes

- 1) Program Quality.** The BS degree program in Environmental Health and Safety will achieve excellence and recognition for high quality in teaching and learning, including the achievement of national accreditation. (A&T Strategic Goals 2, 3, and 6)

The EHS program has performed exemplary since the last SACs accreditation in receiving national accreditation (ABET) and GSP recognition and demonstrating a high level of teaching and learning. They will continue to work on field certifications for faculty and maintaining quality in advising.

- 2) Program Productivity.** The BS degree program in Environmental Health and Safety will meet or exceed the University's goals for research/creative productivity, enrollment, retention, degree completion, and placement of graduates in jobs or graduate education. (A&T Strategic Goal 6 and vision for making a significant difference in the lives of those we educate)

While the overall research effort of the faculty is excellent, the EHS faculty need to continue to strive to be successful on larger grants and should consider focus areas, improvement in grant writing skills. The EHS faculty need to be encouraged to find ways to support and obtaining funding for PhD students and their research work. We will also seek to obtain funding from upper level management to equip lab spaces and enhance preliminary data. There are current pending grants and still time remains to observe further success.

Although enrollment and graduation appears steady over the last 3-yrs, the EHS faculty is in the process of increasing enrollment by the following activities: reaching out to more community colleges and high schools, writing articulation agreements, and enhancing the website to engage the outside community. The EHS program is encouraged that more chemistry and physics courses will be added online to improve graduation and retention rate. EHS faculty need to seek additional avenues for scholarship. The EHS advisory board has been revitalized with new members (in 2020) and scholarships will be a focal point of discussion going forward for 2021 and beyond. Job placement appears to be quite high for the EHS program. The department plans to survey all students over the past 5 years 2015-2020 this summer 2020 to get a more accurate count and determine where students are and their satisfaction in the EHS related job.

- 3) Program Contributions to Community Engagement.** The BS degree program in Environmental Health and Safety will contribute appropriately to intellectual climate and creative exchange, professionalism, civic engagement, inclusiveness, cultural awareness, and respect for diversity. (A&T Strategic Goals 1, 2, 4, and 5)

Faculty will be encouraged to continue collaboration, and their creative and intellectual contributions to the department, college, university and nation which are impressive for a faculty body of three. However, more interaction with high schools and community colleges will be encouraged and in turn can improve program outcome 2) pertaining to enrollment increase. Synergistic activities across all three faculty will also be explored across all faculty members in the program. EHS faculty is currently working on an interdisciplinary graduate certificate with 3 other related environmental fields on the campus. These types of collaborative initiatives can highlight the other program activities.

b. Student Learning outcomes (closing loop based on latest assessments)

The overall program mission of Environmental Health and Safety at North Carolina Agricultural and Technical State University is to prepare men and women in the scientific, managerial, and supervisory areas required in Environmental Health and Safety. As such, rubrics used to address the SLO's are designed to address how prepared our student are to contribute in the EHS field.

The overall health of the program is good. The assessments, since 2018 indicate that in most SLO's at least 80 percent of students are attaining an 80% or better. Moving forward, emphasis must be on keeping the program resilient in order to avoid falling in any of these areas. Changes were made in 2018-2019 to switch to the evaluation of EHS 498 for SACs SLO's, away from multiple courses. There will be some further consideration for changes in the EHS 498 course as the sole course being assessed for all 4 SLOs. The course can also be made more rigorous by addressing consistency in experiences in the field. Please see below for individual comments on closing the loop for each SLOs. EHS 432 (Design of Engineering Hazards Controls) is another senior level course that offers the opportunity to look at critical thinking skills given the development of comprehensive safety plans in the field. However, in the meantime other opportunities are mentioned below for improving the delivery of EHS 498. Given the use of assessments under our ABET accreditation, we will also explore more strategic ways to integrate and overlap the assess SACs and ABET courses. ABET has now converted to 6 SLO's for which some are very similar to SACS and for which multiple of our courses are under ongoing assessments

(1) Communication Skills.

Overall, the communication assessment shows that our students are performing well due to its assessment in the Senior year when students have matured in the program. Expectations are set early in the course and communication has been assessed using the final presentation. Oral assessment appears to be more rigorously assessed compared to the written assessment. A new rubric looking at written communication for the final portfolio will be created for the 2020-2021 cycle to improve performance and assessment. This rubric will be improved to better assess professional writing style and structure, fluency, and vocabulary. Currently some sentence structure, formatting and grammatical errors are being evaluated.

(2) Critical Thinking Skills.

Using the current benchmark, critical thinking is being met. However, we feel that that the assessment is too broad. This SLO is one of the hardest to evaluate as it is best evaluated in the field where things move fast and decisions must be made quickly by the student working in the field with a company/industry mentor. The current course is ideal to gain critical thinking skills but hard to evaluate by faculty consistently across all students. Though students are currently meeting the critical thinking benchmark, newer ways to evaluate this will be tested though an interactive, individualized, assessment where students are asked to actively think through a situation they observed and write about decisions made during the experimental experience. This can then be incorporated into the final report. Other courses will be explored for this skills assessment.

(3) Disciplinary Expertise.

The outcome of disciplinary expertise was previously not met 2018-2019 (two semesters 75%) and then improved for 2019-2020 (100%). More clear instructions were provided to students about disciplinary competencies (e.g., writing report using EHS technical terms, performing distinct activities within the EHS discipline-setting safety standard). Students were able to demonstrate over the last year better understanding and application of material learnt in the field and in their EHS courses. Changes in the curriculum of new courses (e.g., risk assessment, toxicology) will also allow us to look at newer more relevant competencies in the field.

(4) Research/Creative Engagement

The research and creative engagement objective is currently being met (2018-2020-at 80%). In order to continuously improve, more opportunities for undergraduate research experiences in courses can be explored to introduce students to creative research or engagement in the EHS field. By definition, the students are forced to engage with industry in their EHS 498 course. The course write-up also requires a reflective conclusion that evaluates their reporting of experiences and engagement, however the EHS team will explore additional research tasks that can be incorporated into the assessment.

Program Coordinator-Emmanuel Obeng-Gyasi

Date:

Department Chair-Alesia Ferguson

Date
