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 tenured and non-tenured faculty (Core) 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 (Non-Core). Located in the College of Science and Technology, the EHS program follows university's guidelines for assessing educational programs. 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.

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.

ASSESSMENT MEASURES

The four student learning outcomes for the BS in EHS program are summarized in the tables below, showing the relationship between the outcomes, the assessment and results, and the improvements made. 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 achieving 70 percent or better for performance for all ABET SLO/s in 2017-2018.

ASSESSMENT RESULTS

The assessment results are presented in Tables 1-4 below, for each of the four learning outcomes.

Table 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.

Method of Assessment	Year	Results of Assessment	Use of Assessment Results for Improvement
Evaluated in 2017-2018 Using ABET SLO G across multiple courses (variable rubrics) for EHS 311. EHS 394, EHS 498 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). 2020-2021, Safety Plan in EHS 432 was evaluated.	2017-2018	ABET score-3.84/4.00 (meets objective)	Too broad an assessment across multiple courses. Change in courses being evaluated for SACs to EHS 498 in 2018.
	2018-2019	For the N= 8 students, the standard of at least 80 % attaining a score of 80% or better was met (100% in Fall and 80% in Spring and Summer 2019).	First year of assessment using EHS 498. Using one course seems to have streamlined the assessment process. Students have performed well, no major changes needed.
	2019-2020	The N = 5 students met the standard of at least 80% attaining a score of 80% or better (100%)	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. A new course may also be evaluated.
	2020-2021	There were a total of 3 students in the main program.	Due to COVID all students took course online. Student will be provide with written and organizational tips, guidance on how to reference

Table 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.

Method of Assessment	Year	Results of Assessment	Use of Assessment Results for Improvement
Evaluated in 2017-2018 Using ABET SLO B across multiple courses of EHS 311 and EHS 313 (variable rubrics)	2017-2018	ABET Score 3.1/4.0. (does not meet objective-78%)	Change in courses being evaluated for SACs to EHS 498 in 2018
	2018-2019	N = 8: Overall 50 % of the students met the objective of	Interventions: e.g., more activity on the discussion board, detailed email reminders were implemented for the

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. 2020-2021, Safety Plan in EHS 432 was evaluated.		scoring 80% of higher. Objective not met	next year, emphasizing students needing to read the rubric to clearly understand what was being assessed here.
	2019-2020	N = 5, 80 percent of students scored 80% or better. Objective met.	Even though objective is met for this critical thinking SLO, students may not be getting the same critical thinking skills due to varied experiences in different internships. Considerations are being made to change this SLO assessment to EHS 432 (Design of Engineering Hazard Controls) to enable students to be assessed the same way. Other considerations include giving an assignment midway through the EHS 498 course which is focused on critical thinking. This will also enable similar and rigorous analysis.
	2020-2021	Only 1% of the 3 students met the 80% target. There were a total of 3 students in the main campus program.	More guidance will be provided on proper referencing and plan organizations. A review of the rubrics will be an assignment

Table 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.

Method of Assessment	Year	Results of Assessment	Use of Assessment Results for Improvement
Evaluated in 2017-2018 Using ABET SLO K across multiple courses (variable rubrics) for EHS 313, EHS 394. 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). 2020-2021, Safety Plan in EHS 432 was evaluated.	2017-2018	ABET Score 3.4/4.0 (meets objective)	Changes in course being evaluated from a total score against multiple courses to EHS 498 in 2018
	2018-2019	Fall 2018, N = 3, only 67 percent of students achieved an 80 percent or better. Spring and Summer 2019, N = 5, 100% achieved the 80% or better objective	Improvements were made in student understanding of requirements to get improved scores after the Fall. Specifically, instruction was changed to provide students with prompts that focused them on the learning outcome and to take it literally. Each time students were engaged, they were prompted again and again. Additionally, the rubric was broken down into different sections so students were aware of what SACS objective was being assessed. This enabled students to understand what constitutes disciplinary expertise.
	2019-2020	Fall 2019, N = 5, 100% percent of students attain a score of 80 or better.	Even though objective was met, the program is considering evaluating this objective in another senior course, where students can demonstrate the same expertise. Field experiences although

			valid may vary. Considerations are also being made to add specific assignments within EHS 498 which will assess disciplinary expertise.
	2020-2021	Only 1 of the 3 students met the 80% target. There were a total of 3 students in the main campus program class.	An example case study will be provided to demonstrate the critical thinking process to be applied to this scenario

Table 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.

Method of Assessment	Year	Results of Assessment	Use of Assessment Results for Improvement
Evaluated in 2017-2018 Using ABET SLO C across EHS 432 in their ability to research safety and hazard controls for a safety plan. Evaluated in 2018-2020 in EHS 498: Clear evidence of participation in various EHS activities which demonstrate research and creative engagement with field mentors. Students also write a reflective conclusion in final report. 2020-2021, Safety Plan in EHS 432 was evaluated.	2017-2018	ABET Score: 3.73/4.0 (93% meets objective)	Changes in course being evaluated from a total score against multiple courses to EHS 498 after 2017-2018
	2018-2019	Fall 2018, N=3, 100 % of students attained a score of 80 or higher, Spring and Summer 2019, N = 5, 80% of student attained the 80% of higher	Students were encouraged to engage with their field mentors in creative ways, research relevant standards, and improve reflections in report conclusions
	2019-2020	Fall, N= 5, 100 % meet the objective of 80%.	Even though the SLO of research and creative engagement was met, faculty feel that creative engagement in the field is challenging to assess and are discussing alternative courses or measures such as specific assignments within EHS 498.
	2020-2021	There were a total of 3 students in the main campus program class. All scored 87.5 and above	Although met, we will include a better focus on ethical codes for EHS professionals.

Summary

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 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 (Science and Management Tracks) were approved by the Provost in 2018 and implemented in Fall 2019.

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. 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 above 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 assessment 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 undergoing assessments.

Department Chair-Alesia Ferguson Date