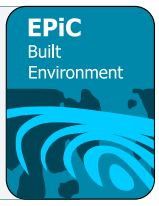

EPiC Series in Built Environment

Volume 6, 2025, Pages 11–20

Proceedings of Associated Schools of Construction 61st Annual International Conference




# A Comparative Study of ACCE-Accredited Construction Programs' Curricula

Md Ashiqur Rahman[1], Lufan Wang[1], and Nipesh Pradhananga[1]
[1]Florida International University

The development of well-structured curricula is at the cornerstone of quality education. In construction, there exist a variety of programs with diverse curricula. Sharing insights from these programs can encourage the adoption of best practices and help new program administrators improve their offerings to better address the evolving industry needs. In this paper, the authors conducted a comparative study of the 77 ACCE (American Council of Construction Education)-accredited construction programs in the United States. The curricula design of these programs is systematically compared based on the frequency of courses used to evaluate the 17 ACCE-defined student learning outcomes (SLOs). The findings of this study aim to identify key trends, highlight differences, and explore opportunities for improvement in construction education.

Keywords: Construction Education; ACCE (American Council of Construction Education); Curricula Design; Student Learning Outcomes (SLO); Accreditation

## Introduction

The construction industry is a major contributor to the U.S. economy. It employs around 8 million people and contributes over two trillion dollars every year (Associated General Contractors of America, 2023). Construction management programs play a crucial role in preparing students to successfully enter this vital industry. The curricula of these programs must meet industry needs, comply with educational standards, and equip students with the necessary skills to succeed in a complex and dynamic work environment in construction. However, there still lacks a comprehensive review of how construction programs across the U.S. function. Each program has its unique characteristics. Especially in this AI era, there is a pressing need to revisit the established construction programs, identify best practices, and propose new directions on curricula improvement to keep pace with industry changes.

To this end, this paper presents preliminary results from a comparative analysis of the curricula for the 77 ACCE (American Council of Construction Education)-accredited construction programs in the U.S. This effort allows for a benchmarking of common practices in existing construction programs, and the program leadership can leverage this study to identify areas where their program can improve. This analysis can also aid ACCE in evaluating current gaps and challenges across institutions, as well as the emerging trends within the current landscape in education, guiding new policies to fit the

change in the industry. Furthermore, it allows prospective students to make informed decisions based on the curriculum offerings of different programs.

## Background

### *Accreditation of Construction Programs*

Accreditation of academic programs serves as a critical measure of quality assurance and adherence to established educational standards (U.S. Department of Education, 2024). For construction-related fields, there are three main accreditation programs – the American Council for Construction Education (ACCE), the Accreditation Board for Engineering and Technology (ABET), and the Association of Technology, Management, and Applied Engineering (ATMAE). ACCE is a preeminent accreditation program specifically for construction education. Established in 1974, ACCE has become a leading global advocate of quality construction education (ACCE 2024). There are 15 ACCE-accredited Associate's degree programs, 77 Bachelor's degree programs, and 5 Master's degree programs nationwide. ABET accredits college and university programs in applied science, computing, engineering, and engineering technology. For construction-related fields, ABET typically accredits civil engineering, construction engineering, and construction engineering technology programs, with an emphasis on ensuring technical competencies and problem-solving abilities (ABET, 2024). There are 91 construction-related programs that are ABET accredited in the U.S. ATMAE is a specialized accreditor for technology, management and applied engineering degrees (ATMAE, 2024). It was initially recognized by the Council for Higher Education Accreditation (CHEA) in 2002. There are 23 construction-related programs that are ATMAE accredited in 2023.

### *Differences among Construction Programs*

Construction programs in higher education can vary significantly. Although all programs relate to construction, currently offered programs can be primarily classified into construction engineering, construction management, construction technology, and building construction. Each of these programs emphasizes different aspects of construction education, which in turn shapes the curriculum and the skillsets of their graduates that leads to different career paths. For example, Construction Engineering (CE) programs typically emphasize engineering principles, structural analysis, and design, which require intensive knowledge in mathematics, physics, and engineering. Construction Management (CM) programs focus more on the whole construction process, such as project management, estimating, scheduling, and business aspects of construction, offering a balanced mix of technical and management courses, and are typically offered with strong industry connections. Construction Technology (CT) programs emphasize hands-on technical skills and applied construction methods, which often take a more practical approach than CE or CM programs. Building Construction (BC) programs often combine architectural concepts with construction practices. While these programs have distinct focuses, they share common elements such as safety management, construction documents, estimating, scheduling, construction materials and methods, and project management fundamentals. The main distinctions among these programs lie in their depth of technical content, management focus, balance of practical versus theoretical knowledge, typical career paths, and departmental organization within their institutions.

### *Existing Research and Knowledge Gaps on Construction Program Accreditation*

Several research efforts have focused on curriculum design and accreditation in construction-related fields. Most of the existing studies are conducted to analyze the accreditation requirements and their implementation or the course design to fulfill specific Student Learning Outcomes (SLOs). For

example, Leathem (2020) developed a performance criteria model that involved industry experts, faculty, and alumni to evaluate each SLO. Alhorani et al. (2021) presented the process and lessons learned of a civil engineering program seeking first-time ABET accreditation. Shane et al. (2018) compared the different requirements of ACCE and ABET accreditation, and developed rubrics that translate the general ABET student outcomes into measurable units specific to the construction engineering curriculum. Taylor et al. (2014) presented the practices of curriculum changes to integrate BIM (Building Information Modeling) in their ACCE-accredited program.

Despite the importance of existing research, there is still a lack of comprehensive analysis that evaluates how construction programs systematically incorporate and assess the SLOs across their curriculum design. Existing efforts typically examine individual program curricula and specific learning outcomes; however, a comparative analysis is necessary to benchmark and identify common practices among peers, and increase transparency in curriculum development, execution and graduation standards.

Therefore, the purpose of this study is to analyze the curricula of the 77 ACCE-accredited construction programs in the U.S. ACCE-accredited programs were chosen because of their construction-specific standards and their widespread recognition within the industry. Specifically, this study aims to answer the following research questions:

1. How do ACCE-accredited construction programs vary in their approaches to implementing and assessing the required SLOs across their curricula?
2. What are the common patterns and distinctive strategies employed by ACCE-accredited programs in mapping their course offerings to meet specific SLO requirements?
3. What best practices can be identified from existing implementations in ACCE-accredited construction programs?

## Methodology

This study utilized SLO assessment reports of 77 ACCE-accredited universities in the U.S. to evaluate the curricula of various construction programs. The list of programs and their SLO assessment reports were obtained from the most recent publicly available information from ACCE's website (ACCE 2024). The data within SLO reports were based on two primary assessment types: (1) direct assessment and (2) indirect assessment. According to the collected data, direct assessments were conducted through various relevant courses within the construction programs of all ACCE-accredited programs. In contrast, most indirect assessments were based on the feedbacks from student, alumni, and employer surveys. Hence, this paper focuses on direct assessments to present the findings.

The collected data were organized into a structured database for analysis. Each program's assessment report was reviewed to extract relevant details regarding course codes and course titles for direct and indirect assessments for each of the 17 SLOs, as listed in Table 1. It can be observed that the SLOs follow Bloom's Taxonomy to establish learning goals and outcomes, with SLOs 1-5 requiring students to have the highest level of mastery and be able to "create" original work on the topic; SLOs 6-7 require students to "analyze" a problem by breaking down the information and understanding relationships among parts; SLOs 8 and 9 require students to "apply" acquired knowledge to solve new problems; and SLOs 10-17 to "understand", classify, compare and explain concepts.

In cases where information was incomplete or unavailable, those programs were excluded from the analysis to ensure consistency, resulting in the inclusion of 62 programs from the total sample.

Finally, the study applied descriptive statistics, such as frequency counts and percentages of distributions, to summarize the characteristics and patterns of the data and interpret the findings.

**Table 1.** Description of ACCE-Defined Student Learning Outcomes (SLOs)

| SLO | Description of SLO |
|---|---|
| 1 | Create written communications appropriate to the construction discipline. |
| 2 | Create oral presentations appropriate to the construction discipline. |
| 3 | Create a construction project safety plan. |
| 4 | Create construction project cost estimates. |
| 5 | Create construction project schedules. |
| 6 | Analyze professional decisions based on ethical principles. |
| 7 | Analyze methods, materials, and equipment used to construct projects. |
| 8 | Apply electronic-based technology to manage the construction process. |
| 9 | Apply basic surveying techniques for construction layout and control. |
| 10 | Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process. |
| 11 | Understand construction accounting and cost control. |
| 12 | Understand construction quality assurance and control. |
| 13 | Understand construction project control processes. |
| 14 | Understand the legal implications of contract, common, and regulatory law to manage a construction project. |
| 15 | Understand the basic principles of sustainable construction. |
| 16 | Understand the basic principles of structural behavior. |
| 17 | Understand the basic principles of HVAC, electrical, and plumbing systems. |

## Results and Discussion

Figure 1 shows the geographic distribution of the 77 ACCE-accredited construction programs across the U.S. Among the 50 states and District of Columbia, 36 states have ACCE-accredited programs, with California, Texas, and Florida the most, while the majority states, about 47%, have only one ACCE accredited construction program.

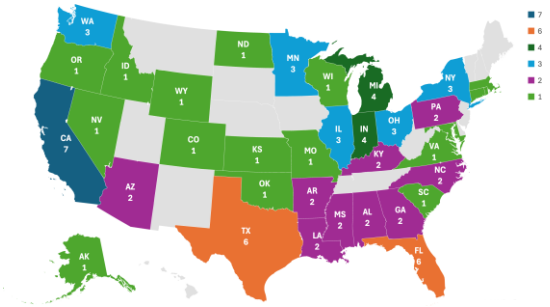



**Figure 1.** Number of ACCE-accredited construction programs by state (n=77)

ACCE provides a list of accredited programs along with their respective departments, colleges, and universities. At the departmental level, construction programs appear to be hosted by similar departments across the U.S. For example, sixty (60) programs are housed within the "Construction Management" department; "Construction Science and Management" and "Construction Science" departments housed 4 programs each. There are two programs each in the "Building Construction" and "Construction Management Technology" departments, while departments named "Construction

Management and Technology", "Construction Technology and Management", "Building Construction Science", "Construction Systems Management", and "Center for Construction" has one program each.

However, the uniqueness of construction programs shines when analyzing at the college level. Figure 2 shows a word cloud of the college names that housed these programs. Common terms such as "Engineering", "Construction", "Architectural" and "Business" are expected. However, there are also construction programs housed in colleges of Food, Agriculture, Justice and Health, and Human Sciences. This observation illustrates the diversity in the student demographic that ACCE caters to and supports the importance of this type of comprehensive studies to maintain homogeneity and consistency across all ACCE accredited programs. This finding can help administrators planning to start construction management programs in their universities to learn from other universities and find an appropriate home for the new program in their respective universities. Note that generic terms like "College", "Institute", "of" and "the" have been excluded from the word cloud, and similar terms like "Technology" and "Technologies" have been grouped.


**Figure 2.** Word cloud generated from the college names housing the ACCE-accredited programs

Figure 3 illustrates the distribution of the programs by the number of unique courses used for ACCE Accreditation for the 17 SLOs. As seen in the figure, most of the programs utilized 11-14 courses for accreditation, which accounts for around 57% of all accredited programs. However, it is also interesting to see that one of the programs uses only 2 courses to assess all 17 SLOs, while there are also programs that use more than 20 courses to assess the same 17 SLOs. While collecting data from a fewer number of courses eases the data collection process and maximizes the ability to make quick changes, it can also be acknowledged that narrowing the range of courses is a missed opportunity for a comprehensive evaluation of the curricula and unforeseen circumstances in one semester can sway the results and impact the institution's representativeness of the data. It could also give the impression to faculty and students that other courses are not as important in the program. Hence, a balanced approach might be preferred and that is what most of the programs seem to have adopted.

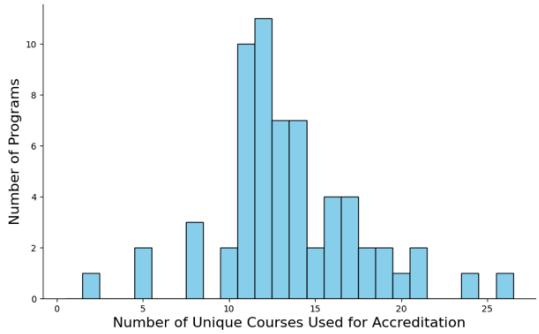



**Figure 3.** Distribution of the programs by number of unique courses used for accreditation (n=62)

Figure 4 demonstrates the variation in the unique number of courses utilized to assess each SLO across all programs in the U.S. For SLOs 3, 5, 10, 13, and 15, all the programs utilized no more than two courses to assess, with more than 80% of the universities using only one course. The SLOs encompass themes related to construction safety, scheduling, project delivery, project control, and sustainability. Additionally, word clouds were generated using the course names corresponding to each SLO to gain a deeper understanding of the topics associated with these SLOs. The full results are shown in the Appendix. This paper presents preliminary findings on analysis of the SLOs solely by the names of the courses that are used to assess the respective SLOs. Additional analyses of course syllabi, combination of courses for each SLOs and levels of assessment are necessary to make more informed decisions. For instance, Figure 5 illustrates the word cloud generated from the names of the courses used to assess SLO 3. In this visualization, terms such as safety, management, and project emerge more prominently, reflecting their higher frequency and significance within the relevant courses. This observation emphasizes the reliance on a different set of courses for assessing SLO 3 across construction programs. The frequency and dispersion of words in the word cloud shows how construction programs across the nation have been handling the SLOs and serve as a guide to administrators willing to start new programs or make changes to their existing curriculum. While generating the word clouds, terms like "construction" and "building" were excluded to prevent their obvious dominance, and general terms like "and", "introduction to" and "for" were excluded to focus on the keywords. Similar terms like "estimating" and "estimation", "schedule" and "scheduling" and "structures" and "structural" were grouped together.

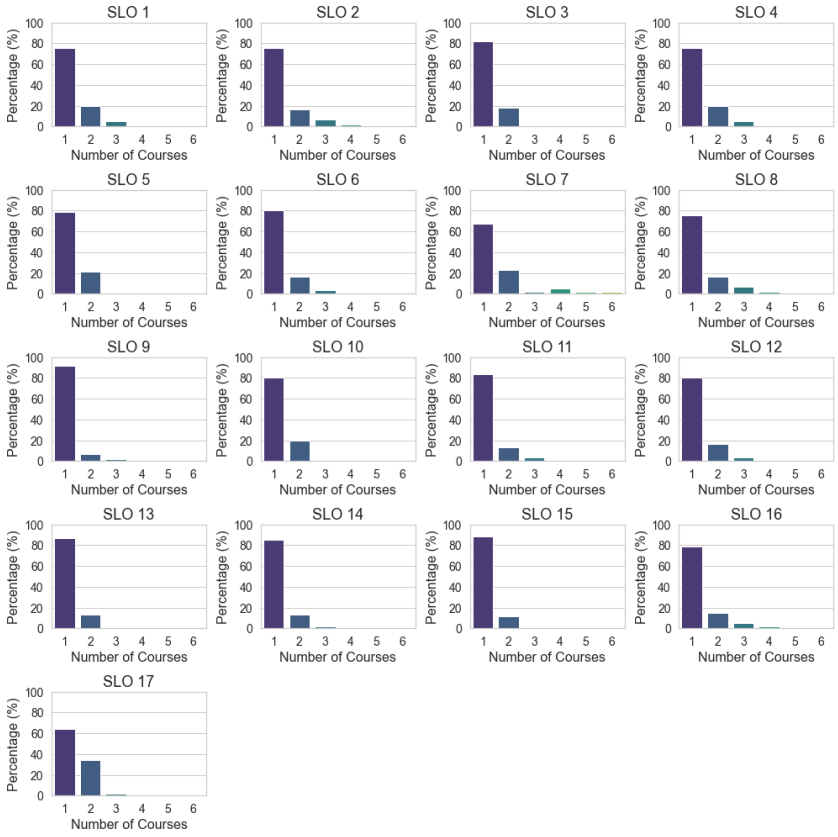



**Figure 4.** Percentages of programs and numbers of courses utilized for each SLO


**Figure 5.** Word cloud generated from the names of the courses used to assess SLO 3

For SLOs 6, 9, 11, 12, and 14, a maximum of three courses were utilized for assessment, as presented in Figure 4. These SLOs are topics related to ethics, surveying, accounting and cost control, quality assurance, and contracts and construction law. The data shows that over 80% of the programs rely on a single course to assess these SLOs; however, some variability is observed in the distribution of courses used for assessment. For example, SLO 9, which emphasizes applying basic surveying techniques for construction layout and control, is predominantly assessed through surveying courses at most universities (shown in Figure 6). However, other courses, including those related to plan reading and specifications, soil mechanics, and mechanical and electrical systems also contribute to the assessment. This implies that while surveying is offered as a stand-alone course in many programs, there are programs that assess students' surveying knowledge through other courses, some possibly in courses outside their programs.


**Figure 6.** Word cloud generated from the names of the courses used to assess SLO 9

In contrast, SLOs 1, 2, 4, 7, 8, 16, and 17 exhibited a sparse pattern where more courses were employed for their assessment. For instance, SLO 1, which aims to evaluate student performance in creating written communications appropriate to the construction discipline, was assessed mainly by capstone project but also demonstrated a trend with many other courses, such as internships, construction contracts, safety, and estimating (shown in Figure 7). This indicates that while many programs commonly use the capstone project to evaluate SLO 1, the selection of courses varies

significantly across programs. The choice could also be impacted by the nature of the knowledge itself. For example, "written communication", is not typically regarded as highly specialized in construction programs to dedicate its own course. For this observation, administrators can find some liberty to accommodate the assessment in a course that already has a suitable assignment for the SLO.

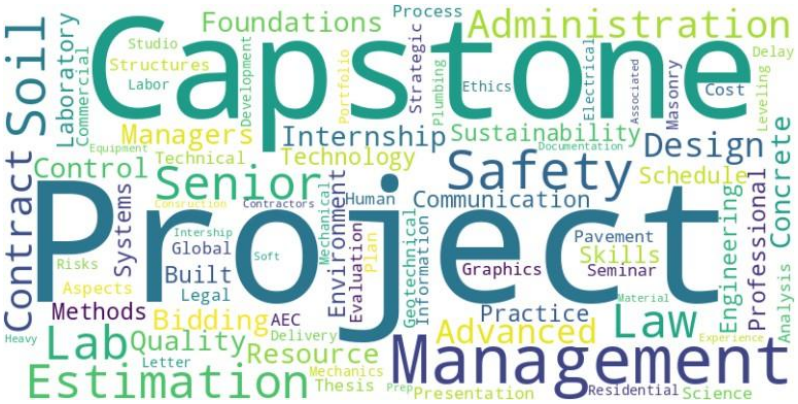



**Figure 7.** Word cloud generated from the names of the courses used to assess SLO 1

As for SLO 7, which aims to analyze the methods, materials, and equipment used in construction projects, approximately 10% of programs utilized between three and six courses for assessment. The word cloud in Figure 8 highlights terms such as methods, equipment, and material that are prominently represented across these courses for this SLO. However, the diverse range of terms shown in Figure 8, such as estimation, foundations, and temporary structures, indicate that some programs incorporated various courses to assess this SLO, which could indicate that such programs do not have a specific course for evaluation of this SLO in their curricula. This visualization highlights that the SLO has been assigned a dedicated course in many programs, to reflect the breadth and depth of knowledge required for students to succeed in their construction careers. Any curriculum changes or initiation of the program should take this into consideration. Furthermore, while trends observed in other construction programs can serve as a reference, the rigor and scope of knowledge provided to students should ultimately be determined by the informed judgment of experts and administrators, to prioritize what is most critical for student success in their esteemed institution.

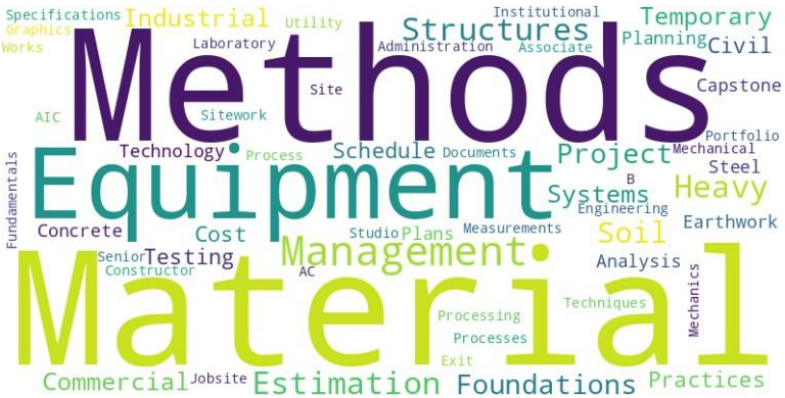



**Figure 8.** Word cloud generated from the names of the courses used to assess SLO 7

## Conclusion

In conclusion, this study provides preliminary results towards a comprehensive analysis of the curricula of 77 ACCE-accredited construction programs in the U.S. and their alignments with the 17 SLOs, offering valuable insights for academic leaders, accreditation bodies, and prospective students. The study identifies that the majority of the programs use 11-14 courses to assess the SLOs, and the unique number of courses used to assess each SLO varies significantly across programs. SLOs related to safety, scheduling, project delivery, project control, and sustainability are most commonly assessed using a single course, whereas other SLOs, such as written communications, construction materials, and methods, demonstrated a diverse range of courses being evaluated. The study identifies both common practices and distinct strategies used by different construction programs to align their curricula with ACCE accreditation standards. These findings can help program administrators identify areas for improvement, encourage the adoption of best practices, and support ACCE in refining its accreditation standards to better reflect evolving industry trends. In their future work, the authors will dive deeper into each program in terms of their admission and graduation requirements, department resources, specific courses offered in the curricula, faculty-student ratio, and industry partnerships to gain a more comprehensive understanding of how these factors contribute to program quality and student success. The authors will additionally explore the indirect assessment of SLOs across various construction programs for future research.

## References

ABET. (2024). *ABET Programs*. Retrieved from https://www.abet.org/.

Alhorani, R. A. M., Abu Elhaija, W., Bazlamit, S. M., & Ahmad, H. S. (2021). ABET accreditation requirements and preparation: Lessons learned from a case study of Civil Engineering Program. *Cogent Engineering*, *8*(1). doi: 10.1080/23311916.2021.1995109.

American Council for Construction Education. (2024). *2024 Annual Report*. Retrieved from https://www.acce-hq.org/.

Associated General Contractors of America. (2023). *Construction Data*. Retrieved from https://www.agc.org/learn/construction-data.

ATMAE. (2024). *About ATMAE Accreditation*. Retrieved from https://www.atmae.org/page/Accreditation.

Leathem, T. M. (2020). Development and Evaluation of a Model for Clarifying ACCE Student Learning Outcomes. *International Journal of Construction Education and Research*, *16*(1), 43–60. doi: 10.1080/15578771.2019.1569572.

Shane, J. S., Karabulut-Ilgu, A., & Jahren, C. T. (2018). Assessing ABET Outcomes in Construction Engineering Curriculum. *Construction Research Congress*.

Taylor, J. M., Liu, J., & Hein, M. F. (2014). Integration of Building Information Modeling (BIM) into an ACCE Accredited Construction Management Curriculum. *44th Annual ASC International Conference Proceedings*, 117–124.

U.S. Department of Education. (2024). *Overview of Accreditation in the United States*. Retrieved from https://www.ed.gov/laws-and-policy/higher-education-laws-and-policy.

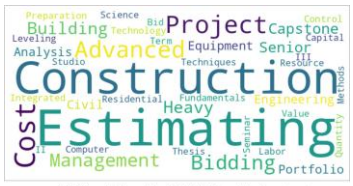
## Appendix

*Word Clouds Generated from the Names of the Courses Used to Assess SLOs*


(a) Word Cloud for SLO 1 (Written Communication)


(b) Word Cloud for SLO 2 (Oral Presentation)

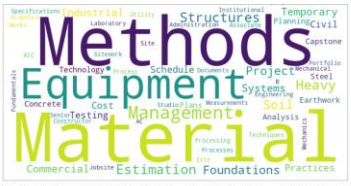

(c) Word Cloud for SLO 3 (Safety Plan)




(d) Word Cloud for SLO 4 (Cost Estimates)


(e) Word Cloud for SLO 5 (Project Schedules)


(f) Word Cloud for SLO 6 (Professional Decisions)

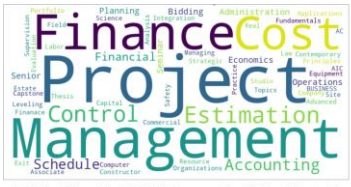



(g) Word Cloud for SLO 7 (Methods, Materials, and Equipment)


(h) Word Cloud for SLO 8 (Electronic-based Technology)


(i) Word Cloud for SLO 9 (Surveying)


(j) Word Cloud for SLO 10 (Project Delivery)



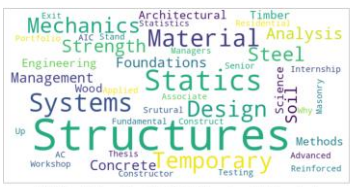

(k) Word Cloud for SLO 11 (Accounting & Cost Control)


(l) Word Cloud for SLO 12 (Quality Assurance & Control)

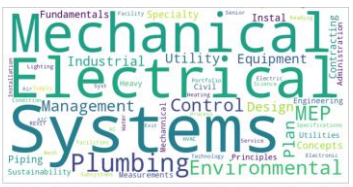

(m) Word Cloud for SLO 13 (Project Control)


(n) Word Cloud for SLO 14 (Contract)


(o) Word Cloud for SLO 15 (Sustainable Construction)




(p) Word Cloud for SLO 16 (Structural Behavior)




(q) Word Cloud for SLO 17 (HVAC, Electrical & Plumbing)