

# **ASSESSMENT REPORT**

## Executive Integrated Processes Certificate in Construction Management

This is a distance education certificate program in the McWhorter School of Building Science. This is the third of three certificate programs in the School. This program started in 2013. A typical cohort of students in this program is between 15 and 25 students. This program starts in spring semester each year and ends in the summer semester of the same year. All students in the program are full time employees in construction or a related sector. Students take two courses each semester. The certificate program has a ‘residency’ requirement where students are on campus for one week to attend classes. A third of the course content is delivered while students are in residency. For the remainder of the semester, students attend weekly online classes, for one-hour per course via a web-based meeting software (Web-Ex). Students also study asynchronous video course material via CANVAS, which is created by faculty. The online classes account for another third of the course content and the asynchronous material accounts for the remainder of the course content.

This program was started as part of the ongoing collaboration between the United States Army Corps of Engineers (USACE) and the McWhorter School since 2009. A majority (more than 90%) of the students in the program are employees of USACE and other agencies within the Department of Defense. The same students that completed the first two certificate programs continue to pursue the third certificate program.

## Student Learning Outcomes

### Specificity of Outcomes

SLO 1: Students will be proficient in processes involved in construction project development. (*Not reported for this assessment*)

SLO 2: Students will be able to evaluate the differences between project delivery methods and their respective contracts, including start-up and closeout procedures and bases for payment.

SLO 3: Graduates will be able to evaluate the role of various stakeholders and their influences in the life of a facility.

SLO 4: Students will be able to research the structural system(s) of a great structure and communicate historical, cultural, and technical forces that helped shape it.

### Comprehensive Outcomes

Several aspects of business processes are integral for the success of a construction manager. These aspects include planning, executing and funding of construction projects. The courses in this certificate program reflect the nature of knowledge and skills needed for a successful construction manager. The faculty agreed that the proposed SLO’s accurately reflect the expected outcomes for the certificate. Each individual SLO is further described for comprehensiveness below.

SLO2: Project delivery methods and strategy options (and their hybridizations) are an important and evolving component of the construction industry, and have significant bearing on documentation, project cash flow, and perhaps most importantly the overall culture of how major parties to the contracts operate for the duration of the project.

SLO 3: The role of a construction professional is to bring a project team together from multiple disciplines to construct a facility in a safe, economical and timely fashion. In the execution of these duties, construction professionals often have to address priorities of various stakeholders, each with a unique impression of what it means for the project to be successful. This SLO attempts to draw attention to the divergent nature of the construction industry and the role of the construction professional to address it.

SLO 4: The culmination of this survey course on Structural Systems is a research project that uncovers the forces that helped to shape a significant structure of the student’s choosing. This includes researching important structural and construction issues involved in the successful realization of the structure. The research results are communicated through an 8-10 page written technical report, physical model, and oral and graphic presentation.

### Communicating Student Learning Outcomes

The student learning outcomes were communicated to the faculty at a graduate faculty meeting. The assessment submissions were also shared with faculty. The student learning outcomes will be posted on the school’s website in the near future.

## Curriculum Map

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Course Title | SLO 1 | SLO 2 | SLO 3 | SLO 4 |
| Construction Integrated Processes - 1 | I, R, M, A |  |  |  |
| Construction Integrated Processes - 2 |  | I, R, M, A |  |  |
| Executive Issues in Construction  |  |  | I, R, M, A |  |
| Structural Systems of Buildings |  |  |  | I, R, M, A |

### I = Introduce, R = Reinforce, M = Master, A = Assess

## Measurement

### Outcome-Measure Alignment

Each of the learning outcomes are related to a skillset for a construction professional. The faculty felt the best way to measure the skillset in an academic setting is to use direct measures such as quizzes, assignments and projects to evaluate student achievement.

### Direct Measures

*SLO 2: Students will be able to evaluate the differences between project delivery methods and their respective contracts, including start-up and closeout procedures and bases for payment.*

This outcome was directly measured based on an exam during the residency portion of the executive-delivered course model, as well as via quizzes throughout the term. The SLO was broken into the following sub-outcomes:

1. Project Delivery Methods, Procurement, and Contracts: Students will demonstrate their ability to compare and contrast a range of delivery methods and their associated procurement and contract agreements that are available for use in the industry. This outcome was measured through a comprehensive exam given after the first third of the semester’s contact hours.
2. Project Process: Students will demonstrate their ability to compare and articulate different processes associated with the range of delivery methods via three tests/assessments:
3. Project start-up procedures, documentation, establishment of schedules of value
4. Cost control, application for payment, and change management
5. Project close-out procedures, and the lien process

*SLO 3: Graduates will be able to evaluate the role of various stakeholders and their influences in the life of a facility.*

Students were presented with ‘Executive Issues’ wherein students are presented with unique problems typical in the construction industry. Often times, these problems were developed by discussions with practicing construction professionals. For this assessment, two of the four executive issues were used to assess the SLO.

1. Executive Issue 1: In this assignment, students were required to react to an ongoing safety situation in a construction company that was facing an existential threat from owners, government and regulating agencies due to their poor accident record and lack of a safety culture. Students were given three specific situations to address. The first one was to address jobsite personnel through a memo immediately following a safety incident and provide a press statement. The second one was to create a long-term plan to develop a culture of safety within the organization. This had to be done in the form of a report. The final one was to create a board of directors for the company with construction safety as an emphasis for board member selection. Each deliverable was due in one-week intervals. A rubric was not used to grade this assignment.
2. Executive Issue 3: In this assignment, students had to respond to a request from an owner to create a prefabrication plant for building hospitals in Florida. Students had to research a proper location, construction techniques, transportation logistics and potential budget for the proposal. Students had three weeks to respond to this assignment. A rubric was used to grade this assignment.

*SLO 4: Students will be able to research the structural system(s) of a great structure and communicate historical, cultural, and technical forces that helped shape it.*

This SLO outcome was directly measured by detailed review and feedback of the student’s work in five stages, each graded by the instructor.

**Proposal:** Student submits a project proposal identifying a significant structure to be approved by instructor. Student must identify:

* Key information about the structure (location, date, designer, builder, materials, structural system, etc.)
* Justification for great structure status
* Three credible references

**Outline:** Student provides an outline detailing how they plan to defend in a report their approved structure as a great structure. This includes:

* Key information about the structure
* Justification for great structure status
* Research question
* Research objectives
* Identification of structural system(s)
* Four or five credible references

**First Draft:** Student submits a first draft of their report, which is returned with copious comments and feedback.

**Final Report:** Student submits a 2500-3000-word final draft of their revised report, incorporating instructor feedback from first draft review.

**Presentation:** Student submits a graphic and oral presentation summarizing their research findings and report.

### Data Collection

The data collected for the generation of the report varied for each individual SLO. For all SLO’s reported in this assessment, the data was collected directly from student grades on quizzes, projects and assignments.

## Results

### Reporting Results

***SLO 2: Students will be able to evaluate the differences between project delivery methods and their respective contracts, including start-up and closeout procedures and bases for payment.***

1. Project Delivery Methods: Students were taught about the availability of different project delivery strategies, their history and evolution, and their ability to be hybridized. They were also exposed to the range of available strategies for the procurement of design and construction services, as well as contracts and associated bases for payment. Students were assessed on their knowledge of these considerations in a comprehensive exam delivered after the residency portion of the executive delivered class, approximately 1/3 of the contact hours for the course. The class average for the exam is presented in the table below. A rubric was not used to grade the quizzes.

|  |  |  |
| --- | --- | --- |
| **Assessment** **#** | **Assessment Sequencing Topic** | **Class Average** |
| 1 | Project Delivery, Procurement, and Contracts | 94.16 |

1. Project Procedures/Management: Students participated in instructor-led discussions, case studies, and peer presentations on project procedures and management topics as described above, after which they were assessed via three respective quizzes. Class averages are shown below:

|  |  |
| --- | --- |
| **Assessment** | **Class Average** |
| Quiz 1 – Project start-up, documentation, SOV | 94.89 |
| Quiz 2 – Cost control, pay apps, change mgmt | 95.54 |
| Quiz 3 – Project close-out and the lien process | 95.16 |

***SLO 3: Graduates will be able to evaluate the role of various stakeholders and their influences in the life of a facility.***

|  |  |
| --- | --- |
| ITEM | Class Average |
| Executive Issue 1 – Part A – Reaction to Site Accident and Press Statement | 92% |
| Executive Issue 1 – Part B – Development of a Long-term Safety Initiative | 96% |
| Executive Issue 1 – Part C – Board of Directors Constitution | 98% |
| Executive Issue 3 – Development of Prefabrication Plant for construction of Hospitals | 93% |
| Report Organization (on a scale of 5) | 4.7 |
| Overall Approach (on a scale of 5) | 4.8 |
| Project Budget (on a scale of 5) | 4.3 |
| Project Location (on a scale of 5) | 4.8 |
| Logistics and Transportation (on a scale of 5) | 4.8 |
| Research on Construction Techniques | 4.6 |
| Uniqueness and Innovation | 4.8 |

***SLO 4: Students will be able to research the structural system(s) of a great structure and communicate historical, cultural, and technical forces that helped shape it.***

For each of the five project stages the following rubrics were used to grade student work. Averages are for the 15 students enrolled in the course:

1. Proposal

|  |  |  |
| --- | --- | --- |
| Criteria  | Points  | Class Average  |
| Title  | 1.0 pts |  |
| Great Structure Description | 2.0 pts |  |
| Great Structure Justification | 3.0 pts |  |
| Great Structural Features  | 3.0 pts |  |
| Construction Features | 3.0 pts |  |
| 3 credible references  | 3.0 pts  |  |
| Total Points:  | 15 | 12.8 (85.3%) |

1. Outline

|  |  |  |
| --- | --- | --- |
| Criteria  | Points  | Class Average  |
| Title  | 1.0 pts |  |
| Great Structure Description | 2.0 pts |  |
| Research Question, Objectives  | 3.0 pts |  |
| Structural System Type  | 2.0 pts |  |
| Outline  | 3.0 pts |  |
| 4 credible references  | 4.0 pts  |  |
| Total Points:  | 15 | 13.8 (92%) |

1. Draft

|  |  |  |
| --- | --- | --- |
| Criteria  | Points  | Class Average  |
| 8-10 page report  | 5.0 pts |  |
| Images with proper formatting | 5.0 pts |  |
| Quality of content | 40.0 pts |  |
| Writing quality (grammar, etc.) | 10.0 pts |  |
| Appropriate References, use | 10.0 pts |  |
| Total Points:  | 70 | 60.3 (86.1%) |

1. Report

|  |  |  |
| --- | --- | --- |
| Criteria  | Points  | Class Average  |
| 8-10 page report  | 5.0 pts |  |
| Images with proper formatting | 5.0 pts |  |
| Quality of content | 40.0 pts |  |
| Writing quality (grammar, etc.) | 10.0 pts |  |
| Appropriate References, use | 10.0 pts |  |
| Total Points:  | 70 | 66.2 (94.6%) |

1. Presentation

|  |  |  |
| --- | --- | --- |
| Criteria  | Points  | Class Average  |
| PowerPoint Quality  | 8.0 pts  |  |
| Oral Presentation Delivery | 7.0 pts |  |
| Extra Credit (+2) |  |  |
| Total:  | 15 | 13.6 (90.7%)  |

### Interpreting Results

SLO2:

1. Project Delivery: Assessment results for the exam suggest that there is a reasonable level of comprehension and ability to compare and contrast methods. The assessment is objective, perhaps there may be benefit in also including more in-depth assessment for which there is subjectivity, given it is a graduate level course.
2. Project Procedures/Management: Assessment results for the three respective quizzes suggest that as a group, students demonstrated reasonable understanding of project processes. This may suggest an opportunity to also include applied/contextual assessment in the future, in lieu of solely objective assessment.

SLO 3: Students performed very well in the executive issues course, based on grades presented in the assessment criterion. Students were coached in leadership related themes in the construction industry that contributed to their elevated level of discussion in the course. In-class discussion also prompted students to address the executive issues with specificity and students were encouraged to seek counsel from practicing construction executives, which also enhanced their approach to addressing each of the major assignments in class.

SLO 4: The Structural Systems of Building Course is taken by students with a variety of backgrounds, including engineering. The purpose of this course is to gain a conceptual understanding of the behavior of structural systems using great works of engineering and architecture, as well as the temporary structural systems used to build them. Students are guided through the exploration of the various forces (social, and cultural as well as physical) that helped shape great structures. Student knowledge is evaluated through 3 tests covering course basics and a research report. Emphasis is placed on uncovering the influence construction systems and processes have had in shaping great works of the built environment.

The pacing of the research report in stages has proven an effective means of guiding students through the research process. Feedback from each stage gives students the opportunity to refine and improve their work toward a successful outcome. This is evidenced by the measured improvement in average scores from the first report draft (86.1%) to the Final Draft (94.6%), an increase of 8.5%.

### Communicating Results

The results of this assessment are shared with graduate faculty in the McWhorter School of Building Science. A faculty meeting of the graduate faculty was held to discuss the results of the assessment.

## Use of Results

### Purposeful Reflection and Action Plan

The results of the assessment exercise did not indicate any glaring issues as they relate to student learning outcomes. Faculty agreed to make minor changes in the course they teach. No large scale changes are expected to be made at this time.