Chapter
4

Assessment Report for the Construction Management Program

Section 1: Executive Summary

This review is part of our overall program assessment planning process. It is a critical self-analysis designed to systematically evaluate our program by concentrating on: (1) what it is doing, (2) how well it is operating, and (3) how it can be strengthened. Our process focuses on:

- Assessing the true state of the program
- Identifying our accomplishments
- Identifying areas for improvement and recommending how to implement improvements
- Developing information to be used for improving the program
- Ensuring the program is meeting the accreditation standards as set forth by our accrediting body

This report provides the opportunity for interested parties to review the current state of the Construction Management (CM) undergraduate program at Roger Williams University (RWU). The reporting period covers the academic year starting July 2020 thru June 2021 (AY20/21). The purpose of this report is to focus on assessment of academic activities throughout the year. The data were collected through a variety of measurements tools including surveys, interviews, reports, course assessment reports (CAR), and meeting minutes.

AY 2020/2021 was a very busy, challenging, and productive year for the CM program, as indicated by the following highlights:

- Enrollment numbers continued the recent upward trend, with current enrollment at ≈ 227 students. This includes a significant number of students transferring from other programs at RWU including but not limited to engineering, architecture, education, business, and undeclared majors. The increased numbers are an indicator of the strength and demand of the program.
- One new full-time visiting faculty member was hired to start in fall of 2021. Dr. Shirley Tandoh from the University of Florida will join the CM faculty and bring knowledge and experience in construction management technology and building information modeling (BIM).
- The adjunct faculty pool now stands at 19 people with ~35% of current course offerings being taught by adjunct faculty members.
- The program continues to develop expanded research and teaching uses of laboratory spaces, including the Emerging Technologies Laboratory (ETL) in the new SECCM laboratory building.
- Students continued to conduct faculty-led, funded research in unique areas of interest.
- Student clubs and competition teams continued to represent the program, School, and institution at national events, as evidenced in Figure 4.1-1.

Figure 4.1.-1. Officers of the Student Chapter of the Association of General Contractors at the Annual Convention

Section 2: Introduction

The CM Program is accredited by the American Council for Construction Education (ACCE). The CM program was last reaccredited in Spring 2017 and is scheduled to be re-evaluated in Fall 2022. During each year of accreditation, the program has published an annual assessment report that complies with the assessment and strategic plans.

On an annual basis, the program faculty collectively review the assessment methodology, data collection instruments, and scope of the assessment process. Each faculty is asked to help collect data from specific sources, which are then reviewed by the group. The data that are collected from a wide array of sources provide the basis of measuring our success in meeting our defined objectives and outcomes as outlined in the SECCM Assessment Plan.

The CM Program focuses on providing the student both the collaborative skills and the technical skills to lead and manage a construction project. The construction graduate will work closely with owners, architects, engineers, and trade contractors throughout the entire design-build process. Graduates will typically take responsibility for the budgeting, scheduling, and control of the construction operation. Construction careers are

broadly diversified, with our graduates finding employment in the principal industry sectors including residential, commercial building, heavy highway, and industrial. In addition, all CM graduates take the classes required to achieve a Business minor. The Construction Management Program is designed to encompass six functional categories of courses, which are detailed in the following section. Each of these categories provides the student with an essential component of their overall educational experience and ensures that students are prepared for construction management practice as required by our accrediting body. These categories are:

- General Education
- Mathematics and Science
- Business and Management
- Construction Science
- Construction
- Other program specific courses

COVID-19 Impact
There are numerous instances where the pandemic affected the program in both negative and positive ways. This includes but is not limited to club activity, competition participation, community service projects, site visits, and achievement of the program learning outcomes. The assessment data provided in assessment tables later in this report will indicate with "CV19" when no data are available for the assessment due to the pandemic.

Section 3: Curriculum Design

As discussed above, the CM curriculum has been structured around six operating classifications of courses. Each of these classifications is discussed below.

General Education
It is important that every constructor's education include appropriate courses in communications, social sciences, and the humanities. This content should reflect the needs of the construction industry as well as the philosophy of the educational institution. Construction is concerned with people and their relationships. Thus, the ability to communicate, both orally and in writing, and the understanding of human behavior are essential assets to the constructor. Table 4.3-1 summarizes the credit requirements in this area.

Table 4.3-1. Summary of Credit Hours Required for General Education

Course #	Course Title	Credits
COMM 210	Intro to Public Speaking	3
CORE 102	Structures of Power	3
CORE 103	Human Behavior in Perspective	3
CORE 104	Literature Philosophy & Examined Life	3
CORE 105	Artistic Impulse	3
WTNG 102	How Writing Works	3
WTNG 220	Critical Writing for the Professions	3
CORE 4xx	Senior Core Seminar	3
Total Credits		**24**

Mathematics and Science
It is essential that every constructor possess a well-developed concept of mathematics and physical science. Construction is in part a technical process that can be best controlled by applying the principles of mathematics, statistics, and computer science. Furthermore, an understanding of the behavior of the materials, equipment, and methods used in construction requires knowledge of the

laws of physics, chemistry, geology, and environmental sciences. Basic scientific, quantitative, and qualitative topics, which provide a foundation for subsequent technical subjects, are to be considered in this category. Table 4.3-2 summarizes the credit requirements in this area.

Table 4.3-2. Summary of Credit Hours Required for Mathematics and Science

Course #	Course Title	Credits
MATH 124	Basic Statistics	3
MATH 136	Pre-Calculus	4
PHYS 109	Physics I-Algebra Based + Laboratory	4
MATH 207	Applied Calculus	3
---	Physical Science Elective[1]	4
Total Credits		**18**

[1] A natural science elective with a laboratory such as CHEM 191, BIO 103, or NATSC 103

Business and Management

The constructor also is a manager. To be an effective manager, the constructor must know how to manage the principal resources of the industry, i.e., people and money. The constructor should have a broad understanding of the fundamentals of the free enterprise system, accounting, finance, business regulations, contract law, labor law, and marketing. This category involves fundamental courses to provide a foundation for contemporary business practices appropriate to applications in construction. No specific number of semester hours or subject areas are required for accreditation; however, eighteen semester hours are required in this category for the CM program, allowing students to earn a minor. Table 4.3-3 summarizes the credit requirements in this area.

Table 4.3-3. Summary of Credit Hours Required for Business and Management

Course Number	Course Title	Credits
ACCTG 101	Accounting I: Financial	3
ECON 102	Principles of Microeconomics	3
MGMT 200	Management Principles	3
MRKT 200	Marketing Principles	3
LS 220 or BUSN 305	Legal Elective	3
	Business Elective	3
Total Credits		**18**

Construction Science

The constructor must understand the contribution of the design discipline's processes. The constructor must be able to communicate with design professionals and should be capable of participating during the planning phase of design-build projects. Construction sciences and architectural or engineering design topics selected to facilitate communications with the design disciplines and to solve practical construction problems are included in this category. Table 4.3-4 summarizes the credit requirements in this area.

Table 4.3-4. Summary of Credit Hours Required for Construction Science

Course #	Course Title	Credits
CNST 130	Plans, Specifications and Building Codes	3
CNST 200	Construction Methods and Materials and Lab 1	4
CNST 201	Construction Methods and Materials and Lab 2	4
CNST 204	Construction Statics	3
CNST 250	Construction Equipment	3
CNST 302	Surveying and Laboratory	4
CNST 304	Applied Structures	3
CNST 455	Mechanical and Electrical Design for Buildings	3
Total Credits		**27**

Construction

The construction curriculum category is of vital importance in a quality construction curriculum. Courses should include both office and field activities and include the effective management of personnel, materials, equipment, costs, and time. All types of construction should be included. Curricular topics should address the constructor's role as a member of a multi-disciplinary team, the assessment of project risk, and the alternate methods that can be used to structure the owner-designer-constructor team. Course work will examine the various roles and responsibilities of project participants throughout a project's life and the creative ways that project teams can be assembled. Fundamental topics to provide an appropriate combination of breadth and depth in current construction industry practice are to be considered in this category. These topics should develop skills that will facilitate advancement of the individual in the construction profession. Construction courses should be presented in a manner that encourages problem definition and solution, creativity, communication, evaluation, and continuous learning. The knowledge, understanding, and skills gained from prerequisite courses should be integrated and utilized in subsequent courses. Table 4.3-5 summarizes the credit requirements in this area.

Table 4.3-5. Summary of Credit Hours Required for Construction

Course #	Course Title	Credits
CNST 100	Introduction to Construction Management	3
CNST 116	Computer Applications in Construction	3
CNST 260	Construction Estimating and Scheduling	3
CNST 321	Advanced Building Estimating	3
CNST 445	Construction Project Management and Lab	4
CNST 450	Construction Planning and Scheduling	3
CNST 475	Construction Project Control	3
CNST 480	Construction Management Capstone	3
CNST XXX	Construction Elective	3
Total Credits		**28**

Other Program Requirements

The RWU Core Concentration involves a five-course exploration of one discipline unrelated to the major. Construction management students select their core concentration from 39 different fields of study. Examples include a foreign language, Environmental Science, Mathematics, Computer Science,

Sustainability, and more. This requirement ensures that all RWU students graduate with significant knowledge of at least two fields: that of the major and that of the core concentration. Table 4.3-6 summarizes the credit requirements in this area.

Table 4.3-6. Summary of Credit Hours Required for Construction

Course #	Course Title	Credits
---	Core Concentration	15
Total Credits		**15**

Section 4: Program Health and Status

AY 20/21 found the CM program in a very good position to continue to provide top-notch construction education to current and future students. The health of the program is demonstrated by solid enrollment, high graduation rates, student participation in competition teams and clubs, industry participation and support, dedicated faculty, and status amongst peer institutions.

Enrollment

The CM program is in a very healthy state in terms of enrollment. Program growth has been steady (Figure 4.4-1) over the past eight years, with the largest growth year-over-year rate exhibited from AY 18/19 to AY 19/20. Similar growth is observed in the number of students graduating each year (Figure 4.4-2).

Figure 4.4.-1 CM Student Enrollment Over the Past ~Decade.

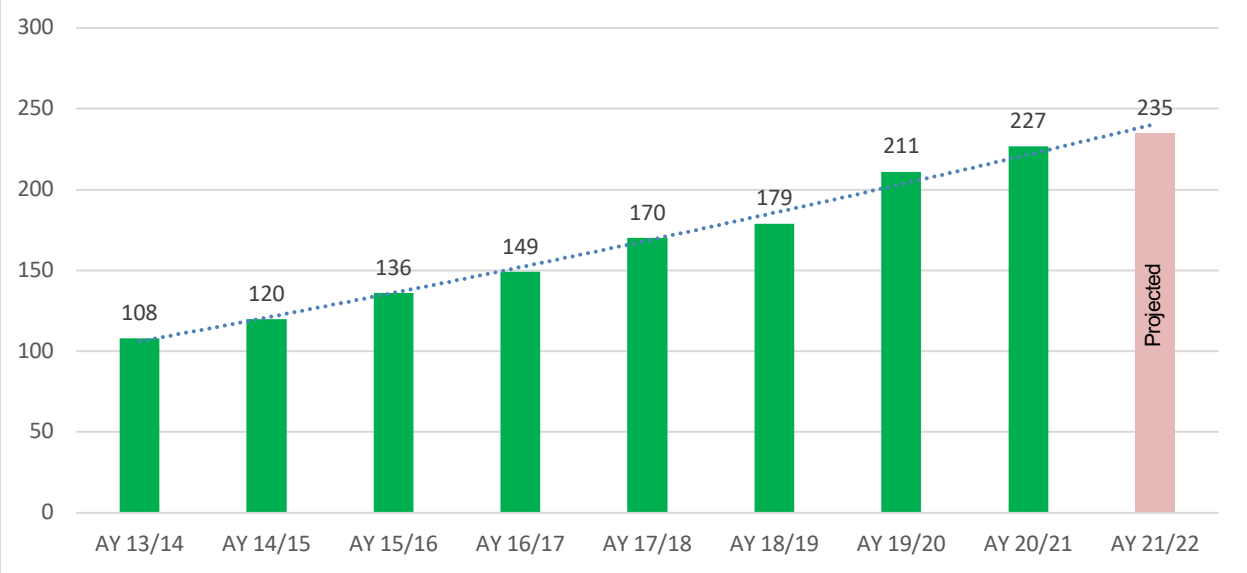
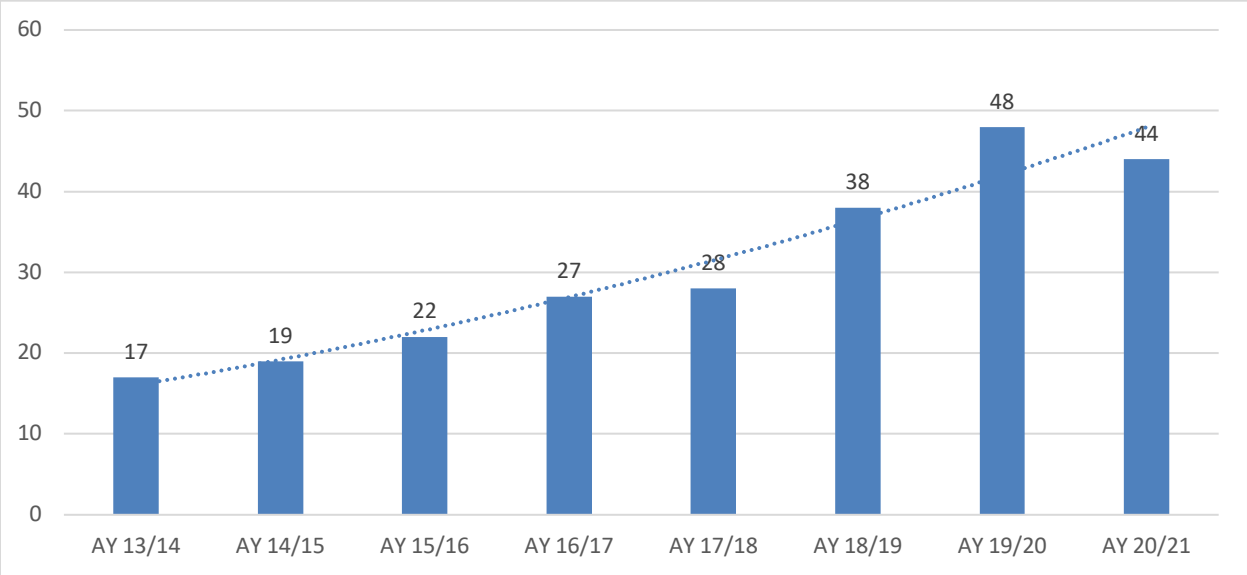


Figure 4.4.-2 CM Student Graduates Over the Past ~Decade.



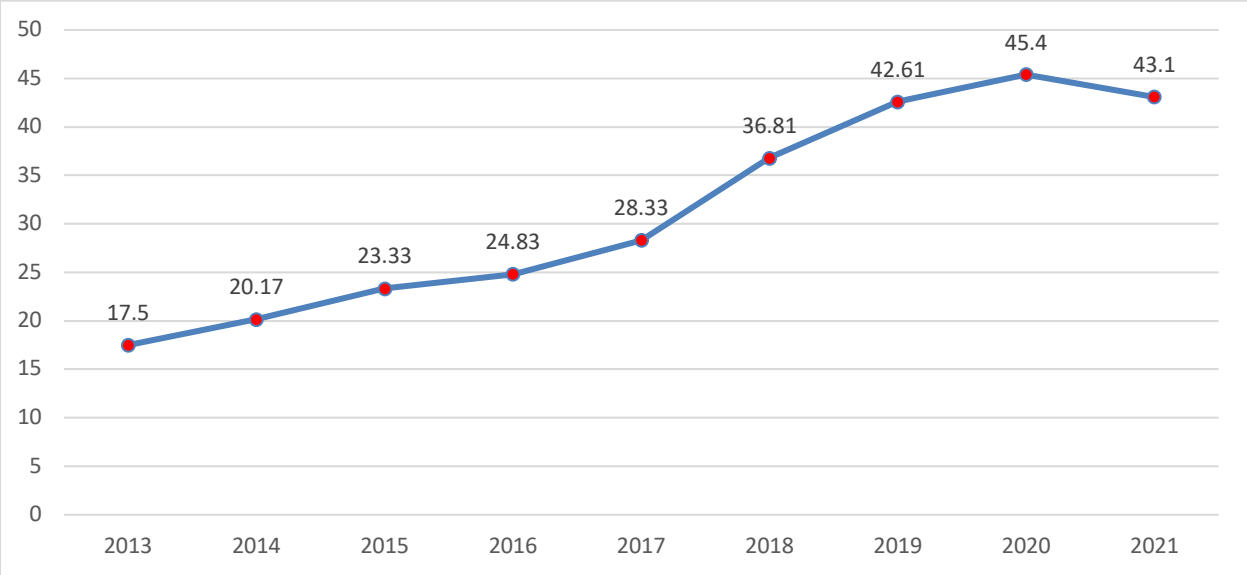
Industry Participation
Excellent contractor participation is evidenced by the addition of a third mentor for the Capstone course. Many industry professionals have devoted time, money, resources, and support to the program in CM club activities, preparation of competition teams, and donations to support student trips.

Academics
With the use of additional spaces in the new SECCM Laboratories building, we were able to expand the methods and materials laboratories and develop new technology research in the ETL. Several faculty members are working on the addition of new CM electives. The eventual goal is to have four specialization tracks with two courses each:

- Residential Construction and Development
- Heavy-Civil Construction
- Sustainability
- BIM and New Technologies

The large student-to-faculty ratio (see Figure 4.4-3) continues to be an issue. Addition of new full-time faculty continues to help, but even with the addition of one or two faculty members, the ratio still be one of the largest (if not the largest) on campus.

Figure 4.4-3. CM Undergraduate Student to Full-Time Faculty Ratio (2021 projected)



Faculty
The CM program continues to enjoy a group of passionate and dedicated faculty who work very hard to provide a solid and comprehensive educational experience to prepare graduates for the challenges of the industry. When asked, CM faculty step up to teach overloads so that the students' academic plans are not delayed.

Section 5: Program Assessment

Assessment is achieved through multiple sources that evaluate the quality of the program from an academic, administrative, student, extracurricular, and industry perspective. All of the following data indicate the program is very strong and on an upward trajectory. Metrics shown in Table 4.5-1 include total undergraduate population, student population in first and final years, tenured and tenure-track faculty, and the student to full-time faculty ratio. Table 4.5-2 indicates relevant employment data for graduating students, and Table 4.5-3 shows results of competitions in which CM student teams participated.

Table 4.5-1. Recent History of CM Program Population Metrics

Program Size	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
Undergraduate Program Population	149	170	179	210	227
First-Year Class	51	42	37	56	60
Senior Class	34	34	44	49	44
Tenured Faculty	6	6	4	4	3
Tenure-Track Faculty	0	0	1	1	2
Number of Students per FT faculty	24.83	28.33	36.80	42.61	45.4

Table 4.5-2. Recent History of CM Program Graduating Student Employment

Metric	AY 14/15	AY 15/16	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
Average # Internships per Graduating Senior	2.74	2.73	2.71	2.80	2.81	2.64	2.51
Placement Rate (as of 6 months post-graduation)	100%	100%	93%	95%	95%	100%	95%
Salary Range							
Low		$45,000	$45,000	$40,000	$45,000	$50,000	$48,000
High		$73,200	$72,000	$85,000	$81,700	$83,700	$86,000
Mean		$59,751	$59,926	$62,361	$65,500	$67,531	$63,372
Median		$60,000	$60,000	$61,000	$65,755	$67,000	$63,750

Table 4.5-3. Recent History of CM Program Student Competition Results

Table 9. Student Competition Results											
Competition Placement	**AY 10/11**	**AY 11/12**	**AY 12/13**	**AY 13/14**	**AY 14/15**	**AY 15/16**	**AY 16/17**	**AY 17/18**	**AY 18/19**	**AY 19/20**	**AY 20/21**
ASC											
Commercial	DNP	1st	1st	DNP	DNP	2nd	2nd	DNP	DNP	DNP	NA
Design-Build	3rd	2nd	1st	DNP	1st	2nd	2nd	DNP	3rd	1st	NA
Heavy-Civil	DNP	3rd	1st	DNP	3rd	2nd	DNP	3rd	2nd	3rd	NA
Pre-construction	NA	NA	NA	NA	NA	NA	NA	NA	3rd	NA	NA
National	NA	NA	3rd	NA	NA	NA	NA	NA	2nd	NA	DNP
International	Na	NA	NA	NA	NA	NA	NA	NA	NA	1st	NA
DBIA											
Regional									1st	1st	NA
National									DNP	DNP	NA

Note: Did Not Place (DNP); 2021 competition was virtual

Measurement Tools

The assessment data are collected through a comprehensive variety of measurement tools, each of which help identify specific performance aspects of the program. The data that are collected feed the assessment process and provide the foundation of critical program analysis. These tools are described below.

Senior Exit Survey

This survey is given to all graduating CM seniors on the same day as their capstone presentations and senior exit interviews. The purpose of this survey is to collect data regarding the learning outcomes and other critical aspects of the program. Results of this survey have been folded into the program objectives and outcomes analyses in tables appearing in subsequent sections.

Faculty Survey

Faculty are surveyed on an annual basis to collect their perceptions on critical aspects of the program. Results of this survey have been folded into the program objectives and outcomes in the tables appearing in subsequent sections. AY 20/21 is the sixth year in a row faculty members have been surveyed to collect data in support of several metrics used in the assessment and improvement of multiple program objectives, including:

- Recruit and retain exceptionally qualified and diverse faculty and staff to support the program, school, and university objectives

- Advance the construction management profession by becoming actively involved in professional associations and societies, serving in professional and community volunteer positions, and acting as a role model for future generations of constructors
- Embrace a culture of professionalism, innovation, collaboration, diversity, and tolerance
- Maintain convenient, well-equipped, and state-of-the-art facilities and resources that support learning, application, and research
- Integrate data into program objectives and outcomes analysis

Alumni Survey
A survey was sent out to fifteen alumni of the class of 2016, with response data integrated into program objectives and outcomes analysis in the tables in following sections.

First-Year Survey
AY 20/21 marks the fourth year in a row the first-year students have been surveyed in an effort to collect data in support of the assessment and improvement of the following program objectives:
- Recruit and retain exceptionally qualified and diverse faculty and staff to support the program, school, and university objectives
- Maintain a reputation within the local, national, and international communities as a leading provider of construction education
- Integrate data into program objectives and outcomes analysis

This year's participation rate was 97% compared to last year's 45%. 87% of surveyed first-year students reported that RWU was their first choice of university (decrease from 100% in the previous AY). Also, 79% of all CM first-year students declared construction management major as their first choice of major compared to 67% last year. These results are discussed in depth in the program objectives assessment section at the end of this document; actions are identified to improve the CM selection rating to our 80% target. More details on program objectives, outcomes and assessment of all associated metrics are discussed in the subsequent sections.

Employer Internship Survey
Construction companies were contacted to provide feedback on the CM students they employed as interns. They were asked a series of questions that related to the intern performance and how the interns met the expectations of the employer. In general, employers were very impressed with the knowledge, passion, and understanding of construction processes and procedures.

Employer Survey for Students
Students were also surveyed to identify their internship experiences relative to what they have learned in the program's curriculum.

Senior Exit Interviews
Senior exit interviews were conducted by CM Professional Advisory Board (PAB) member Greg Josselyn '11 via an online MS Teams meeting. The exit interviews provide a setting where students can comment to the CMPAB how they feel about the program without the faculty being present. This an important tool for the advisory board in their advisement of the program. Overall the students expressed a very positive experience and provided relevant suggestions for program improvement. Overwhelmingly, the sense of community and connection amongst the students and the University was very high. The mutual respect between the students and the faculty led to a very successful completion of the school year despite the very difficult times faced due to the COVID-19 pandemic. Despite those challenges, the students seemed to enjoy their time at Roger Williams University, which was best displayed in their expressed interest in returning in the future to support the program. The loyalty of the alumni is evident and exemplified in the high placement rate of graduating students that planned to enter the work force.

Associate Constructors Exam
This exam provides twelve direct assessment data points for the program learning outcomes. None of the students took the exam in spring of 2021. Due to the impact of the COVID-19 crisis, the review course did not take place because access to the exam was not feasible. It is possible that if allowed, our students may elect to

take the exam in the fall of 2021. Feedback from the test scores is usually an important element of our program assessment; adjustments have been made to account for the loss of this information.

Internship Program
For AY 20/21 the vast majority of CM students had at least one internship experience. The goal for the program is that 75% of the students participate in an internship. Based on the data reported, this objective has been met. Discussions with industry representatives indicate the expectation is that students have at least two meaningful internship experiences on their resume when applying for their first full-time job.

Student Club and Competition Team Activities
Student club activity was very limited due to the pandemic. One team participated in the ASC Region 6/7 National Open competition in the Virtual Design and Construction category. This was a virtual competition where the RWU CM team competed against ten other schools from around the US. Student clubs struggled through the pandemic due to not being able to meet in person. Most students were not willing to attend "virtual" club events, which were very difficult to coordinate as a result.

Capstone Project
The Capstone course saw the largest number of students in the history of the program. This year Consigli Construction Company successfully joined as the third mentor company. The projects were challenging and provided both the students and mentors a way to gauge their overall knowledge in construction management topics.

Section 6: Construction Management Program Mission and Objectives

The CM program's mission is to "*advance the body of construction knowledge through instruction, research, and service, and through resourceful graduates who possess the moral foundation and technical skills to lead the profession*."

Table 4.6-1 lists the RWU CM Program Objectives that were developed by program constituencies in an effort to accomplish the program's mission. These objectives were most recently updated in 2015 and were published in the RWU Undergraduate Catalog in 2020, on the websites of both SECCM and the CM program, and in a number of CM promotional materials. The CM Program Objectives are consistent with the goals of the University and promote the mission and values of RWU.

Table 4.6-1. RWU CM Program Objectives

FACULTY AND STAFF: Recruit and retain exceptional and diverse faculty and staff to support program, school, and university objectives.
EDUCATIONAL: Three to five years after graduation, we expect that our graduates: ▪ Demonstrate exemplary cutting-edge technical knowledge and skills. ▪ Value the concept of life-long learning and continue to grow intellectually while keeping informed of new concepts and developments in the construction process. ▪ Are recognized as regional, national, and international construction industry leaders. ▪ Always display the highest standards of ethical conduct.
SERVICE: Advance the construction management profession by becoming actively involved in professional associations and societies, serving in professional and community volunteer positions, and acting as a role model for future generations of constructors.
ALUMNI: Grow and maintain an engaged network of alumni to support and advance program mission and goals.
STUDENTS: Recruit and retain a committed, qualified, passionate and diverse body of students.
CULTURE: Embrace a culture of professionalism, innovation, collaboration, and tolerance.
BRANDING: Maintain a reputation within the local, national, and international communities as a leading academic provider of construction education.
FACILITIES & RESOURCES: Maintain convenient, well equipped, and state-of-the-art facilities and resources to support learning and research.

Section 7: Construction Management Program Outcomes

The CM program outcomes correspond to the knowledge, skills and behavior that are we expect our construction graduates to possess at the time of their graduation. These outcomes are established and periodically updated based on constituency input. In 2015, the CM program adopted American Council for Construction Education (ACCE) Student Learning Outcomes (SLOs) as the Program Learning Outcomes (PLOs). The outcomes that we expect our graduates to possess at graduation are to be able to:

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 construction documents for planning and management of construction processes.
8. Analyze methods, materials, and equipment used to construct projects.
9. Apply construction management skills as a member of a multi-disciplinary team.
10. Apply electronic-based technology to manage the construction process.
11. Apply basic surveying techniques for construction layout and control.

12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
13. Understand construction risk management.
14. Understand construction accounting and cost control.
15. Understand construction quality assurance and control
16. Understand construction project control processes.
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.
18. Understand the basic principles of sustainable construction.
19. Understand the basic principles of structural behavior.
20. Understand the basic principles of mechanical, electrical and piping systems.

Section 8: Assessment of Construction Management Program Objectives

Tables 4.8-1 through 4.8-11 provide a detailed assessment of all program objectives. These objectives and their metrics along with our mission statement were published in 2015 after a full year of extensive strategic planning in collaboration with the program faculty, administration, students, industry advisory board, and alumni.

Table 4.8-1. Metrics and Targets for CM Program Objective 1

FACULTY AND STAFF			
Objective #1: Recruit and retain exceptional, qualified, and diverse faculty and staff to support program, school, and University objectives.			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors report to be satisfied or very satisfied with the helpfulness of the CM staff	Senior Exit Survey	No	78.38% (very close)
CM faculty and staff demographics are representative of other programs in ASC Region 1	Faculty Biographies	Yes	Female, international
At least one academic conference or presentation or journal paper published by 80% of FT tenured or tenure-track faculty.	Faculty Survey	No	60%, CV19
At least one academic conference presentation or publication co-authored by at least one FT faculty and an undergraduate student.	Faculty Survey	Yes	Çelik, Anderson, Ramaji
50% of FT faculty conducted at least one consulting activity for the construction industry or research with industry support or faculty internship.	Faculty Survey	Yes	60%

Table 4.8-2. Metrics and Targets for CM Program Objective 2

EDUCATIONAL Three to five years after graduation, we expect that our graduates:			
Objective #2: Demonstrate exemplary cutting-edge technical knowledge and skills			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as somewhat agree or strongly agree: CM program increased my technical knowledge and skills	Senior Exit Survey	Yes	86.5%
At least 80% of alumni (5 years out) answer the following question as satisfied or very satisfied: The RWU CM program helped me to demonstrate exemplary cutting-edge technical knowledge and skills	Alumni Survey	Yes	100%
CM Program Learning Outcomes (PLO) assessment indicates 100% of PLO's to be satisfactory or lists specific action plans to address any PLO's that are indicated as weaknesses	PLO Assessment	Yes	See action plans in following section
At least 80% of the employer's report intern: - Technical knowledge as outstanding or satisfactory - Estimating skills as outstanding or satisfactory - Scheduling skills as outstanding or satisfactory - CAD or Revit skills as outstanding or proficient - Excel skills as outstanding or proficient	Employer Internship Survey	Yes	NA

Table 4.8-3. Metrics and Targets for CM Program Objective 3

EDUCATIONAL Three to five years after graduation, we expect that our graduates:			
Objective #3: Value the concept of lifelong learning and continue to grow intellectually while keeping informed of new concepts and developments in the construction process			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as somewhat agree or strongly agree: The CM Program has got me interested in lifelong learning or continuing education.	Senior Exit Survey	No	64.87%
At least 80% of alumni (5 years out) answer the following question as agree or strongly agree: The RWU CM Program helped me recognize the value of the concept of lifelong learning and continue to grow intellectually while keeping informed of new concepts and developments in the construction process.	Alumni Survey	Yes	100%
At least 50% of CM seniors sit for the AC Level 1 exam	Exam Attendance	No	CV19
At least of 20% of alumni (5 years out) report to have received a graduate degree or certificate.	Alumni Survey	Yes	28.5%
Action Item(s)	Increase the awareness and importance of lifelong learning by incorporating into course material		

Table 4.8-4. Metrics and Targets for CM Program Objective 4

EDUCATIONAL Three to five years after graduation, we expect that our graduates:			
Objective #4: Are recognized as regional, national, and international leaders in the construction industry			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as agree or strongly agree: The CM Program has increased my enthusiasm to become a leader in the construction industry	Senior Exit Survey	Yes	91.89%
At least 80% of alumni (5 years out) answer the following question as agree or strongly agree: The RWU CM Program helped me obtain the skills necessary to become a regional, national, or international leader in the construction industry	Alumni Survey	Yes	100%
At least 5% of all RWU alumni with a profile in LinkedIn is holding an executive or higher position in the construction industry	LinkedIn Data	Unknown	NA
At least 1% of all RWU alumni with a profile in LinkedIn has worked or is working in a construction related area outside the US	LinkedIn Data	Unknown	NA
At least one RWU CM alumni was nominated as the current academic years' CMPAB Distinguished Person of the Year Award	CM Coordinator	No	No person-of-the-year this year, CV19

Table 4.8-5. Metrics and Targets for CM Program Objective 5

EDUCATIONAL Three to five years after graduation, we expect that our graduates:			
Objective #5: Always display the highest standards of ethical conduct			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the assessment question for PLO #6 (Ethical Principles) as agree or strongly agree	Senior Exit Survey	Yes	86.89%
At least 80% of graduating seniors answer the following question as agree or strongly agree: It is as important to be ethical as it is to follow the law.	Senior Exit Survey	Yes	91.89%
At least 80% of alumni (5 years out) answer the following question as agree or strongly agree: The RWU CM Program helped me to always display the highest standards of ethical conduct.	Alumni Survey	Yes	100%
At least 80% of alumni (5 years out) answer the following question as agree or strongly agree: It is as important to be ethical as it is to follow the law.	Alumni Survey	Yes	100%
Capstone course assessment report indicates that the direct assessment of its ethics CLO is equal to or higher than 80%	Capstone Ethics Outcome	Yes	87%

Table 4.8-6. Metrics and Targets for CM Program Objective 6

SERVICE			
Objective #6: Advance the construction management profession by becoming actively involved in professional associations and societies, serving in professional or community volunteer positions, and acting as a role model for future generations of constructors			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as agree or strongly agree: The CM Program has motivated me to join a relevant professional society	Senior Exit Survey	No	37.84%
At least 50% of alumni answer the following question as "YES": Are you actively involved in professional associations or societies or serving in professional or community volunteer positions?	Alumni Survey	Yes	57.14%
100% of FT faculty are active members of at least one construction related professional organization	Faculty Survey	Yes	100%
100% of CM students received Feinstein Service Learning credit prior to graduation	Transcripts	Yes	Graduation requirement
At least on CM student group was involved with construction related community service	Student Club Reports	No	CV19
Action Item(s)	Provide alumni workshops promoting participation in professional societies		

Table 4.8-7. Metrics and Targets for CM Program Objective 7

ALUMNI			
Objective #7: Grow and maintain an engaged network of alumni to support and advance program mission and objectives			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as somewhat agree or strongly agree: I am planning to support and advance the program mission and objectives after graduation	Senior Exit Survey	No	70.2%
At least 80% of alumni answer the following question as "YES": Have you had any direct engagement with the CM program or a faculty member since graduation?	Alumni Survey	No	14%
At least 50% of the PLO mentors are graduates of the CM program	Not utilized this cycle	---	---
At least 30% of the CMPAB members are alumni of the program	CMPAB Membership List	Yes	68%
The number of CM Annual Alumni Banquet attendees exceed 80% of the number of students registered in the program as of the preceding Fall semester	Banquet attendance	NA	CV19
The number of donations to the CMPAB scholarship and the CM programmatic Gift Fund increased compared to the previous year	CMPAB Report	No	Board reported over $25,000 of giving mostly directed toward the Elsch Maisoh Scholarship Fund
Action Item(s)	Work with the Alumni office to increase outreach to CM graduates including alumni events		

Table 4.8-8. Metrics and Targets for CM Program Objective 8

STUDENTS			
Objective #8: Recruit and retain a committed, qualified, passionate, and diverse body of students			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as good or excellent: Please rate the quality of the CM student body	Senior Exit Survey	Yes	91.1%
Diversity statistics of CM students are comparable to RWU or RI race/ethnic/gender data	Registrar/Institutional Research	No	Female population percentage well below that of RWU
Maintain a minimum of 60% 6-year graduation rate	Census Data/Transcripts	Yes	
At least 10% of all graduating CM students participated in student competitions	Senior Exit Survey	Yes	12.5%
Action Item(s)	Increase/target recruitment of diverse students once the CV19 pandemic is over		

Table 4.8-9. Metrics and Targets for CM Program Objective 9

CULTURE			
Objective #9: Embrace a culture of professionalism, innovation, collaboration, and tolerance			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 20% of graduating seniors answer the following question as "YES": Did you participate in a short or long-term study abroad program or any other academic activities abroad during your education at RWU?	Senior Exit Survey	No	2.7%
At least 80% of graduating seniors answer the following question as somewhat agree or strongly agree: RWU CM community encourages and welcomes individuals with different opinions	Senior Exit Survey	Yes	81.08%
At least 80% of alumni (5 years out) answer the following questions as somewhat agree or strongly agree: The RWU CM community encouraged and welcomed individuals with different opinions	Alumni Survey	Yes	85.71%
At least 80% if employers report their interns: - As completely dependable or dependable above average - Quite poised and confident or has appropriate self-assurance - Always on time - Exceptionally well accepted or works well with others	Employer Internship Survey	Yes	NA
At least 5% of all CM graduating students participated in faculty led student research outside of class	Faculty Survey	No	4.1%
CM club arranged at least 4 guest speakers/workshops and the attendance at these events included at least 25% of all CM students	CM Club Report	No	CV19
Action Item(s)	Seek to increase the number of undergraduate students willing to participate in research and to study abroad		

Table 4.8-10. Metrics and Targets for CM Program Objective 10

BRANDING			
Objective #10: Maintain a reputation within the local, national, and international communities as a leading academic provider of construction education			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as somewhat likely or extremely likely: How likely are you to recommend the CM program to others	Senior Exit Survey	Yes	91.89%
At least 80% of alumni (5 years out) answer the following question as somewhat agree or strongly agree: I believe the CM program is a leading academic provider of construction education	Alumni Survey	Yes	100%
Social media account followers increased by 50% as compared to the previous AY	Social Media Accounts Data	Unknown	
At least 80% of all CM freshmen report RWU as their first choice	First-year Student Survey	Yes	93.33%
All student teams competing in competitions placed in the top three	CM Club Report	No	33%
At least 2 faculty (or faculty led students) to present CM related work at a peer reviewed international conferences	Faculty Survey	Yes	2/5
Action Item(s)	Consider reassessment of competition metric once competitions return to full operating status after the CV19 pandemic		

Table 4.8-11. Metrics and Targets for CM Program Objective 11

FACILITIES AND RESOURCES			
Objective #11: Maintain convenient, well equipped, and state-of-the-art facilities and resources to support learning and research			
Metrics Associated w/Objective	**Where Measured**	**Met**	**Comments**
At least 80% of graduating seniors answer the following question as satisfied or very satisfied: Please rate the overall quality of SECCM classrooms and labs	Senior Exit Survey	Yes	81.08%
At least 80% of alumni (5 years out) answer the following question as satisfied or very satisfied: Please rate the quality of the SECCM R-cloud.	Alumni Survey	No	5.41%
100% of CM faculty answer the following statement with somewhat agree or strongly agree: I am satisfied with the SECCM facilities	Faculty Survey	Yes	100%
No CNST lab section exceeds 16 students and no CNST lecture section exceeds 36 students and no CNST course with a computer software related outcome exceeds 24 students	Registrar	No	Laboratory courses meet this outcome, but several computer-based courses had more than 24 students
Action Item(s)	Request the Dean to look into improving the R-cloud and to request additional funding for full-time or adjunct faculty to decrease the student-to-faculty ratio		

Section 9: Assessment of Construction Management Program Learning Outcomes

Tables 4.9-1 through 4.9-20 provide a detailed assessment of all program learning outcomes (PLOs). A summary analysis appears in Table 4.9-21. Note that for PLO assessment from the senior exit survey, proficiency is defined as a mean and median score of 4.0 or above on a 5-point scale (i.e., 80%) where 5 means proficiency achieved and 1 means proficiency not achieved (n = 42, 88% response rate). Alumni survey was for graduates 5 years out (n = 9, 25% response rate).

Table 4.9-1. Metrics and Assessment Tools for CM PLO #1

Outcome #1: Create written communications appropriate to the construction discipline			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors report that they are proficient in creating written documents appropriate to the construction discipline	Senior Exit Survey	Yes	4.49/5
100% of CM students successfully complete at least two writing courses	Transcript	Yes	Mandatory
At least 50% of all CM courses require "creating written communications appropriate to the construction discipline"	Course Syllabi	Yes	CNST 130, 200, 201, 260, 321, 302, 450, 445, 450, 455, 480
CNST 480: Capstone Project, Ethics, and New Technology has adopted this outcome as a CLO	Capstone Syllabus, Final Grades, Term Project Grading Rubric	Yes	---
100% of employers who take a survey will report rising senior interns' writing communication to be either concise, factual, effective, or outstanding	Intern Employer Survey	Yes	NA

Table 4.9-2. Metrics and Assessment Tools for CM PLO #2

Outcome #2: Create oral presentations appropriate to the construction discipline			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors report that their RWU education has prepared them proficiently in communication skills for the workplace	Senior Exit Survey	Yes	4.76/5
100% of employers who respond to the Internships survey will report CM rising senior interns to be either clearly communicating ideas or very articulate	Intern Employer Survey	Yes	NA
100% of seniors will have the opportunity in construction classes to make an oral presentation at least twice a semester during their senior year	CARs	Yes	CNST 445 and CNST 480
100% of all freshmen, sophomore, and juniors will have the opportunity to make an oral presentation in a construction class at least once per year	CARs	Yes	CNST 100, 116, 200, 201, 260, 450
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct (D) and on indirect (I) measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.75/5 I: 4.76/5

Table 4.9-3. Metrics and Assessment Tools for CM PLO #3

Outcome #3: Create a construction project safety plan			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the safety in the workplace to be proficient	Senior Exit Survey	Yes	4.38/5
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct and on indirect measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.25/5 I: 4.38/5
At least 30% of all construction courses will include a construction project safety related CLO and will assess the CLO in their course assessment reports with at least one direct and one indirect measure	Course Syllabi CARs	Yes	CNST 116, 202, 201, 250, 445, 450, 480

Table 4.9-4. Metrics and Assessment Tools for CM PLO #4

Outcome #4: Create construction project cost estimates			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.22/5
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct and on indirect measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.45/5 I: 4.21/5
CNST 321: Advanced Building Estimating will adopt this outcome as one of its CLOs and report the overall average of all associated CLOs to be satisfactory based on at least one direct and one indirect measure of assessment	CAR: average of grades	Yes	D: 4.25/5 I: 4.30/5
90% of employers who respond to the Internship survey will report rising senior interns to be either moderately knowledgeable or very knowledgeable in estimating	Intern Employer Survey	Yes	NA

Table 4.9-5. Metrics and Assessment Tools for CM PLO #5

Outcome #5: Create construction project schedules			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.11/5
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct and on indirect measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.12/5 I: 4.11/5
CNST 450: Construction Planning and Scheduling will adopt this outcome in its CLOs and report the overall average of all associated CLOs to be satisfactory based on at least one direct and one indirect measure	CAR: average of final exam and term project grades	Yes	D: 4.02/5
100% of employers who respond to the Internship survey will report rising senior interns to be either moderately knowledgeable or very knowledgeable in scheduling	Intern Employer Survey	Yes	NA

Table 4.9-6. Metrics and Assessment Tools for CM PLO #6

Outcome #6: Analyze professional decisions based on ethical principles			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.32/5
90% of graduating seniors agree or strongly agree that it is as important to be ethical as it is to follow the law	Senior Exit Survey	No	86.49%
100% of graduating seniors will have reviewed and analyzed an ethics case that focuses on professional and ethical responsibility	Course Syllabi CARs	Yes	In capstone
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct and on indirect measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.55/5 I: 4.32/5
At least 25% of all CNST courses will include an ethics related CLO which will be assessed using at least one direct and one indirect measure	CARs	Yes	CNST 100, 321, 445, 475, 480
Alumni rate their preparation for the workplace proficient regarding this outcome	Alumni Survey	Yes	100%
100% of surveyed alumni agree or strongly agree that it is as important to be ethical as it is to follow the law	Alumni Survey	Yes	100%
Action Item(s)	Initiate follow up investigation to determine why more than 10% of senior students answer the ethical question no in the survey		

Table 4.9-7. Metrics and Assessment Tools for CM PLO #7

Outcome #7: Analyze construction documents for planning and management of construction processes			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient; agree or strongly agree	Senior Exit Survey	Yes	4.35/5
At least 50% of all CNST classes will include a course learning outcome related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports.	CARs	Yes	CNST 100, 116, 130, 200, 201, 260, 321, 450, 455, 480
CNST 480: Capstone will adopt this outcome as a CLO, and in its assessment report will list this CLO to be satisfactory based on at least one direct and on indirect measure of assessment	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.27/5 I: 4.35/5

Table 4.9-8. Metrics and Assessment Tools for CM PLO #8

Outcome #8: Analyze methods, materials, and equipment used to construct projects			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.43/5
At least 50% of all CNST classes will include a course learning outcome related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports.	CARs	Yes	CNST 130, 200, 201, 250, 450, 455, 480, 210
CNST 480 –Capstone will adopt this outcome as a CLO, and its assessment report will list this CLO to be satisfactory based on at least one direct and one indirect assessment report	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.07/5 I: 4.21/5
100% of employers who respond to the Internship Survey will report CM rising senior interns to be either “In tune with the requirements” or “Outstanding” in technical skills.	Intern Employer Survey	Yes	NA

Table 4.9-9. Metrics and Assessment Tools for CM PLO #9

Outcome #9: Apply construction management skills as a member of a multi-disciplinary team			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
All graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.59/5
100% of work eligible CM students will hold at least one construction related employment, internship or co-op during their studies at RWU, prior to graduation	Senior Exit Survey	No	86.49%
CNST 445 Construction Project Management and Safety will adopt this outcome into its CLOs and report the overall average of all associated CLOs to be satisfactory based on at least one direct and one indirect assessment	CAR IPD assignments 1, 2, 3 Final Assignment	Yes	D: 4.15/5 I: 4.14/5
At least three student-led teams will participate in a construction related student competition	CM Club Report	Yes	ASC Region 1 commercial and heavy civil; Region 8 VDC
100% of employers who respond to the Internship Survey will report CM rising senior interns to be either “Gets along with others”, “Works well with others” or “Exceptionally well accepted”.	Intern Employer Survey	Yes	NA
At least 10% of all Construction Management seniors will participate in a student team competition where their performance will be externally judged and assessed	CM Club Report Capstone Presentations	Yes	12.5%
Action Item(s)	Determine the source of the discrepancy between the average number of internships (more than 2) and whether or not 100% of the graduating seniors had an internship		

Table 4.9-10. Metrics and Assessment Tools for CM PLO #10

Outcome #10: Apply electronic based technology to manage the construction process			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
CNST 480 –Capstone will adopt this outcome as a CLO, and its assessment report will list this CLO to be satisfactory based on at least one direct and one indirect assessment report	Capstone Syllabus, Final project grading rubric, course grades	Yes	D: 4.65/5 I: 4.55/5
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.11/5
100% of employers who respond to the Internship Survey will report CM rising senior interns to be either “Extremely” or “Moderately” proficient regarding software program proficiency	Intern Employer Survey	Yes	NA
At least 50% of all CNST classes will include a course learning outcome related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 116, 130, 260, 321, 450, 455, 475, 480
All estimating and scheduling courses will include at least one electronic based technology related CLO in the course syllabus. CLO will be assessed by at least one direct and one indirect assessment method	CARs	Yes	RS Means, On-Screen, MS Project

Table 4.9-11. Metrics and Assessment Tools for CM PLO #11

Outcome #11: Apply basic surveying techniques for construction layout and control			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.08/5
At least three CNST courses will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 116, 130, 201L, 302
CNST 302 –Surveying will adopt this outcome. Final course grade mean and/or median will be equal to or higher than 3.75 on a 5-point scale where 5 means proficiency	CAR Final Course Grade Average	Yes	D: 4.35/5 I: 4.25/5

Table 4.9-12. Metrics and Assessment Tools for CM PLO #12

Outcome #12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.35/5
At least 25% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 100, 130, 260, 445
At least 10% of all graduating seniors will participate in a student competition	CM Club Report Capstone competition	Yes	12.5%
100% of CM students report to have participated in at least one interdisciplinary workshop in collaboration with a non-CM program such as architecture, engineering, business, etc. prior to graduation	Senior Exit Survey	No	100% Mandatory in CNST 445 (with architecture)
CNST 445 –Project Management and Safety will adopt this outcome into its CLOs and report the overall average of all associated CLOs it to be satisfactory based on at least one direct and one indirect assessment	CARs Laboratory Grades	Yes	D: 4.50/5 I: 4.14/5
Action Item(s)	None needed since the students do participate in interdisciplinary workshops in a required course		

Table 4.9-13. Metrics and Assessment Tools for CM PLO #13

Outcome #13: Understand construction risk management			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
CNST 480 –Capstone will adopt this outcome as a CLO, and its assessment report will list this CLO to be satisfactory based on at least one direct and one indirect assessment report	Syllabus Final project rubric CLO grades	Yes	D: 4.05/5 I: 4.21/5
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.32/5
At least 25% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 100, 130, 321, 450, 445, 475, 480

Table 4.9-14. Metrics and Assessment Tools for CM PLO #14

Outcome #14: Understand construction accounting and cost control			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	No	3.95/5
At least 20% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 116, 250, 445, 475
CNST 475 –Construction Project Control will adopt this outcome into its CLOs and report the overall average of all associated CLOs to be satisfactory based on at least one direct and one indirect assessment	CAR CLO 4, 8; grades	Yes	D: 4.10/5 I: 4.10/5
Action Item(s)	Consider addition of ACCT 201 as a prerequisite for CNST 475		

Table 4.9-15. Metrics and Assessment Tools for CM PLO #15

Outcome #15: Understand construction quality assurance and control			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.46/5
CNST 480 –Capstone will adopt this outcome as a CLO, and its assessment report will list this CLO to be satisfactory based on at least one direct and one indirect assessment report	Syllabus Final project rubric CLO grades	Yes	D: 4.22/5 I: 4.17/5
At least 25% of all CNST classes will include a course learning outcome related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 302, 450, 450, 475, 480

Table 4.9-16. Metrics and Assessment Tools for CM PLO #16

Outcome #16: Understand construction project control processes			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.27/5
CNST 475 –Construction Project Control will adopt this outcome into its CLOs and report the overall average of all associated CLOs it to be satisfactory based on at least one direct and one indirect assessment	CAR Average of final grades	Yes	4.10/5
At least 20% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 116, 450, 445, 475

Table 4.9-17. Metrics and Assessment Tools for CM PLO #17

Outcome #17: Understand the legal implications of contract, common, and regulatory law to manage a construction project			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	No	3.86/5
At least 25% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 100, 130, 200, 304, 445, 455
100% of all CM students will successfully complete at least one legal elective course prior to graduation.	Transcripts	Yes	BUSN 305 or LS 220
CNST 445 –Project Management and Safety will adopt this outcome into its CLOs and report the overall average of all associated CLOs to be satisfactory based on at least one direct and one indirect assessment	CAR Law assignment grade average	Yes	D: 4.25/5 I: 4.02/5
Action Item(s)	BUSN 305/LS 220 simply do not help the students understand the concepts. Ask the law school to increase the credits for CLAW 637 from 2 to 3 to give students another option. Move the topical content to CNST 201 to further emphasize the material, including guest speakers (construction attorneys)		

Table 4.9-18. Metrics and Assessment Tools for CM PLO #18

Outcome #18: Understand the basic principles of sustainable construction			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.27/5
At least 5% of graduating seniors will report to have been actively involved with the RWU USGBC Student Group	Senior Exit Survey	No	0%
At least 20% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment report	CAR	Yes	CNST 100, 200, 260, 445, 455
The RWU USGBC Student Group will sponsor at least one educational activity focusing on sustainable construction. The activity will be open to all CM students with no restrictions on eligibility to attend	Club Report	No	Club not active, CV19
CNST 465/540 will adopt this outcome and its final course grade mean and/or median will be 80% or higher	CAR Final Course Grades	Yes	4.16/5
CNST 445 –Project Management and Safety will adopt this outcome into its CLOs and report the overall average of all associated CLOs it to be satisfactory based on at least one direct and one indirect assessment	CAR Average grade of SUST Lab and forum	Yes	D: 4.44/5 I: 4.36/5
Action Item(s)	Revamp USGBC group after the pandemic is completely over		

Table 4.9-19. Metrics and Assessment Tools for CM PLO #19

Table 40. PLO #19: Metrics, Targets, and Assessment Tools			
Outcome #19: Understand the basic principles of structural behavior			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.24/5
At least 20% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CARs	Yes	CNST 130, 200, 201, 204, 304
CNST 204 –Construction Statics will adopt this outcome into its CLOs and report the overall average of all associated CLOs it to be satisfactory based on at least one direct and one indirect assessment	CAR Average of CLOs	No	D: 3.70/5 I: 3.90/5
CNST 304 –Applied Structures will adopt this outcome into its CLOs and report the overall average of all associated CLOs it to be satisfactory based on at least one direct and one indirect assessment	CAR Average of CLO's	No	D: 3.73/5 I: 3.41/5
Action Item(s)	The course instructor for CNST 204 and 304 will investigate why this metric is not being met and which of the specific principles are not being achieved by the students		

Table 4.9-20. Metrics and Assessment Tools for CM PLO #20

Outcome #20: Understand the basic principles of mechanical, electrical, and piping systems			
Metrics Associated w/Outcome	**Where Measured**	**Met**	**Comments**
100% of graduating seniors rate their preparation for the workplace proficient regarding this outcome	Senior Exit Survey	Yes	4.16/5
At least 20% of all CNST classes will include a CLO related to this PLO in the syllabus. All CLOs to be assessed using at least one direct and/or indirect assessment in the course assessment reports	CAR	Yes	CNST 130, 201, 321, 455
CNST 455 –Mechanical / Electrical Design will adopt this outcome into its CLOs and report average of the semester project grades to be satisfactory based on at least one direct and one indirect assessment	CAR Term Project Grades	Yes	D: 4.55/5 I: 4.45/5

Table 4.9-21. Summary Assessment of CM PLO Achievement

PLO #	Description	0-5, Average from Senior Survey Results	Somewhat Agree or Strongly Agree
1	Create written communications appropriate to the construction discipline	4.49	100%
2	Create oral presentations appropriate to the construction discipline	4.76	97%
3	Create a construction project safety plan	4.38	92%
4	Create construction project cost estimates	4.22	84%
5	Create construction project schedules	4.11	78%
6	Analyze professional decisions based on ethical principles	4.32	86%
7	Analyze construction documents for planning and management of construction processes	4.35	92%
8	Analyze methods, materials, and equipment used to construct projects	4.43	94%
9	Apply construction management skills as a member of a multi-disciplinary team	4.59	100%
10	Apply electronic based technology to manage the construction process	4.11	83%
11	Apply basic surveying techniques for construction layout and control	4.08	75%
12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design/construction process	4.35	92%
13	Understand risk management1	4.32	92%
14	Understand construction accounting and cost control	3.95	75%
15	Understand quality assurance and control	4.46	95%
16	Understand project control processes	4.27	92%

17	Understand the legal implications of contract, common, and regulatory law to manage a construction project	3.86	70%
18	Understand the basic principle of sustainable construction	4.27	84%
19	Understand the basic principles of structural behavior	4.24	89%
20	Understand the basic principles of mechanical, electrical, and piping systems	4.16	78%
	Average	**4.29**	

Section 10: Assessment of Previously Implemented Program Changes and Recommendations

Note that this and the following sections intentionally do not address the action items listed in the previous two sections. Instead, those action items are discussed in program faculty meetings in which assessment is discussed; these discussions are documented in meeting minutes. Changes recommended or implemented are then discussed here.

A previous recommendation that warrants discussion is to combine the statics (CNST 204) and structures (CNST 304) courses into one course. This idea was tabled after a lengthy discussion of the benefits and consequences of this idea and its subsequent impact to the program. It was generally acknowledged that the students' lack of basic math skills is a significant contributor to the difficulties they have in both courses. The faculty members agreed to revisit this in the future.

Section 11: Discussion of Recommended Program Changes

The following items were identified at the faculty meetings focused on assessment and action items identified in previous program assessment reports. Recommended program changes include to:

- Increase the number of CNST electives through development of three courses, one to focus on deconstruction, demolition, and materials reuse (Emmer), one to focus on new developments in the AEC industry (Emmer), and one to focus on entrepreneurial opportunities (Ramaji)
- Cap CNST electives at 15 students per section
- Integrate BIM across the curriculum via incorporation of the use of 3-D technologies in a wide range of courses
- Involve more students involved in competition teams and clubs

These changes focus on increasing the number of electives available to the students, ensuring their exposure to state-of-the-art technologies, and enabling close student-faculty interaction during upper-level courses. In addition, we emphasize the value of the competition teams and club activities in the professional development of the students.