AUBURN
UNIVERSITY

COLLEGE OF ARCHITECTURE,
DESIGN & CONSTRUCTION
MCWHORTER SCHOOL OF BUILDING SCIENCE

Dr. Megan Rodgers Good
Director of Academic Assessment
Auburn University

June 30, 2018

Dear Dr. Good

Academic Assessment Report for BS: Building Science (BSCI)

To accompany the submission of the Assessment of Student Learning Outcomes for BS-Building Science (BSCI), a brief explanation on the documents attached is provided and the rationale behind the format followed for this report. The undergraduate Building Science program is required to satisfy two separate assessment requirements. Firstly, it is accredited by the American Council for Construction Education(ACCE) and every six years are required to submit a self-study document for external review, followed by an onsite visit. The current ACCE standards require a Degree Program Assessment Plan and Report. This document is attached. Submission of this plan and report to ACCE is not required until the fall of 2019; however, by using this plan now, it will allow the program to make continued improvement and also have historic data by the time of the next accreditation visit in 2020. You will see from this document that there is an ACCE accreditation requirement to have goals and measurable objectives that go beyond student learning outcomes. This may be of interest to your peer rating teams.

Secondly, there is also a requirement to submit an annual assessment report to Auburn University. The program has elected to submit its Data for Assessment of Student Learning Outcomes Reported to Auburn University Director of Academic Assessment as an Appendix to the Degree Program Assessment Plan and Report. Therefore, in assessing the BSCI programs assessment procedures and report, please review the following appendices contained in the BSCI Degree Program Assessment Plan and Report together with the latest version of BSCI 4990 Rules & Regulations which include the assessment measures and grading rubrics for five of the student learning outcomes:

Appendix A –Data for Assessment of Student Learning Outcomes Reported to Auburn University Director of Academic Assessment
Appendix B – Curriculum Mapping
Appendix C – McWhorter School of Building Science - Minutes of BSCI Quality Improvement Meeting – May 4, 2018
Appendix D - Mapping Changes of Student Evaluation of BSCI 1100 – Introduction to Construction
Appendix E - Mapping Changes of Student Evaluation of SLO - *Organize LEED Green Building activities/ Understand the basic principles of sustainable construction.*
Appendix F - Mapping Changes of Assessment of SLO - Create a construction project safety plan.

In addition, I have also included the Summary Assessment Data that we share with both the BSCI Industry Advisory Council (Overall_Assessment_Data_Fall_2017_IAC.pdf) and the BSCI faculty prior to the annual Quality Improvement Meeting.

Sincerely,

Dr. Richard Burt, MRICS
McWhorter Endowed Chair & Head

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McWhorter School of Building Science – BSCI Degree Program Assessment & Implementation Plan & Report 2017

Assessment Plan

1. **ACCE Accreditation Requirements**
2. **Mission Statement of Degree Program**
3. **BSCI Program Goals & Objectives**
4. **BSCI Program Learning Outcomes**
5. **Assessment Tools**
6. **Performance Criteria**
7. **Evaluation Methodology**

Report for 2017

8. **Data for 2017 Calendar Year**
9. **Annual Quality Improvement Meeting**
10. **Update on Previous Quality Improvement Initiatives**

Appendix A –Data for Assessment of Student Learning Outcomes Reported to Auburn University Director of Academic Assessment

Appendix B – Curriculum Mapping

Appendix C – McWhorter School of Building Science - Minutes of BSCI Quality Improvement Meeting – May 4, 2018

Appendix D - Mapping Changes of Student Evaluation of BSCI 1100 – Introduction to Construction

Appendix E - Mapping Changes of Student Evaluation of SLO - *Organize LEED Green Building activities/ Understand the basic principles of sustainable construction.*

Appendix F - Mapping Changes of Assessment of SLO - *Create a construction project safety plan.*

1. ACCE Accreditation Requirements

From the American Council for Construction Education – Document 103 – STANDARD AND CRITERIA FOR ACCREDITATION OF POSTSECONDARY CONSTRUCTION EDUCATION DEGREE PROGRAMS

9.2.3 Degree Program Assessment Plan

The degree program shall provide evidence of its effectiveness in preparing construction practitioners based on the results of surveys of the graduates, employers of the graduates, industry advisory board, exit interviews, comprehensive exams, capstone projects, or other systematically structured information.

The mission, goals, and objectives shall reflect both short-range and long-range considerations and shall be clear as to the educational and institutional results expected.

At a minimum, the degree program Assessment Plan shall include the following:

a. Mission Statement of the degree program. The mission statement expresses the underlying purposes and values of the degree program.

Degree Program Objectives. The Degree Program Objectives shall be clearly defined and stated in a manner that permits an assessment of achievement.

Program Learning Outcomes. These Program Learning Outcomes shall meet or exceed the ACCE Student Learning Outcomes (section 3.2.2) and be regularly formulated, evaluated, and reviewed with the appropriate participation of faculty, students, industry advisory board, and other pertinent parties.

Assessment tools. These tools shall measure degree program objectives and learning outcomes as stated in B and C above. The frequency for using the tools, and procedures for data collection also shall be stated.

Performance criteria. These criteria shall be used to measure the achievement of the degree program objectives and learning outcomes as stated in B and C above.

Evaluation methodology. This methodology shall be followed for data collection.

Degree programs shall comprehensively describe their assessment plan and document the results for review by the Visiting Team.

2. Mission Statement of Degree Program

The mission of the McWhorter School of Building Science as it relates to the BSCI Degree Program was developed at its Strategic Planning Meeting held from December 8-9, 2011.

Creating stimulating learning experiences by engaging in the discovery of the techniques and management of construction

3. BSCI Program Goals & Objectives

Definitions:

A goal is an overarching principle that guides decision-making. Objectives are specific, measurable steps that can be taken to meet the goal.

3.1 Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI (AU Strategic Goal 2)

- Objective 1.1: Increase the number of high school students accepted to PBSCI
- Objective 1.2: Increase the number of freshman enrolling in PBSCI
- Objective 1.3: Increase the number of unrepresented students in the McWhorter School of Building Science.
- Objective 1.4: Increase the academic ability of students entering PBSCI & BSCI
- Objective 1.5: Increase the number of students enrolled in PBSCI & BSCI

3.2 Goal 2: The McWhorter School of Building Science will provide an enriching educational experience consistent with the needs of its stakeholders.

- Objective 2.1: Implement and assess a student learning outcomes based curriculum consistent with the standards of the American Council for Construction Education and the needs of stakeholders

  Objective 2.2: Increase opportunities for students to have an enriching educational experience through involvement in high impact education practices

3.3 Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry. (AU Strategic Priority 1 – Strategic Goal 1G)

- Objective 3.1: Enhance advisement & preparedness for a career in construction management
- Objective 3.2: Enhance assistance to students to obtain entry-level construction management positions within the southeast United States and beyond
- Objective 3.3: Increase placement of graduates in entry-level positions across diverse sectors of the construction industry.

4. BSCI Program Learning Outcomes

4.1 Defining Learning Outcomes

In accordance with ACCE Document 103: Standards and Criteria for Accreditation of Postsecondary Construction Education Degree Programs - 3.2.2.2 Student Learning Outcomes applicable to 4-year degree programs the following Program Learning Outcomes have been assessed.

Note:

In defining the learning outcomes for a 4-year degree programs, the following verbs consistent with Bloom's taxonomy are used:

Remember: The lowest level of the taxonomy requires students to do very little with the information they are learning. They may be asked to recall, list, or name an idea or concept.

Understand: At the next level, students demonstrate that they understand the content by explaining, summarizing, classifying, or translating the given information.

Apply: At this level, students begin to put the information they are learning into context. Here they are able to integrate ideas across multiple situations, or utilize the content in a new way.

Analyze: Students begin to develop higher order thinking. They may be asked to compare and contrast or take a concept and break it into parts to explore the relationships present.

Evaluate: At this stage, students are asked to judge an idea. This may involve predicting, experimenting, critiquing, or making an argument from evidence.

Create: At the highest level, students are producing new ideas or products that integrate the knowledge they have gained. When students are involved in creating new artifacts, they are actively engaged in the subject matter.

Upon graduation from an accredited ACCE 4-year degree program, a graduate shall 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

4.2 Mapping ACCE Student Learning Outcomes

Section 3.1.5.3 - Determination of Achievement of Student Learning Outcomes of ACCE Document 103 requires all programs at the time of the accreditation visit to "Provide an index, cross-tab, curriculum map, or other form of summary clearly relating Course Learning Outcomes to Program Learning Outcomes and, further, to the Student Learning Outcomes". The curriculum maps in Appendix B, show instruction and assessment mapped between the 20 ACCE SLO's and the Pre-BSCI classes, BSCI 3000 level classes and BSCI 4000 level classes respectively. Instruction with regards to each SLO is identified at 3 levels: I = Introduce; R = Reinforce; M = Master. In addition, the class or classes where program assessment occurs are also identified.

5. Assessment Tools

The following assessment tools, the frequency for using the tools, and procedures for data collection used to measure the Degree Program Objectives and Program Learning Outcomes are set out below:

5.1 Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI

- **Objective 1.1: Increase the number of high school students accepted to PBSCI**
    - Measure: Application #'s & Deposits annually – data collected periodically between October and April by CADC Student Services
        a. Number of Accepted PBSCI Students (Track Numbers at end of each month (October to April))
        b. Number of PBSCI students paying deposits (Track Numbers at end of each month (October to April))
- **Objective 1.2: Increase the number of freshman enrolling in PBSCI**
    - Measure: Enrollment #'s, yield rate annually – data collected every fall by CADC Student Services
        a. Number of PBSCI students enrolling by end of July
        b. Yield Rate - % of accepted students that enroll
- **Objective 1.3: Increase the number of unrepresented students in the McWhorter School of Building Science.**
    - Measure: #, % of unrepresented groups annually - data collected every fall by CADC Student Services.
        a. Percentage of Female students in PBSCI & BSCI
        b. Percentage of African America, American Indian, Asian and Hispanic students in PBSCI & BSCI
- **Objective 1.4: Increase the academic ability of students entering PBSCI & BSCI**
    - Measure: Incoming ACT, Formula GPA - data collected by CADC Student Services.
        a. Average, Min & Max ACT Scores of incoming PBSCI Freshman – measured each fall
        b. Average, Min & Max Formula GPA for incoming BSCI students – measured each semester
- **Objective 1.5: Increase the number of students enrolled in PBSCI & BSCI**
    - Measure: Enrollment in spring, summer & fall semesters
        a. PBSCI Enrollment each semester
        b. BSCI Enrollment each semester

5.2 Goal 2: The McWhorter School of Building Science will provide an enhanced educational experience consistent with the needs of its stakeholders.

- **Objective 2.1: Implement and assess a student learning outcomes based curriculum consistent with the standards of the American Council for Construction Education and the needs of stakeholders**

Measure: Evaluation of Student Learning Outcomes; Direct & Indirect – measured every semester

a. Directly measure the students' ability to meet the 20 ACCE Student Learning Outcomes a – data collected by Undergraduate Program Chair and compiled by School Head. The schedule for the implementation of the direct assessment is set out in pages 45-47.

1. Create written communications appropriate to the construction discipline.
   - *Assessed in BSCI 3200 Construction Communication (First Semester, Junior Year)– Written Documents & Case Study (30% of course grade) Writing Rubric - measures performance over 5 specific criteria*
2. Create oral presentations appropriate to the construction discipline.
   - *Assessed in BSCI 3200 Construction Communication. Case Study Presentation accounts for 15% of final grade. Oral Presentation Rubric - measures performance over 5 specific criteria*
3. Create a construction project safety plan.
   - *Assessed in BSCI 4990 – Thesis. Safety Plan accounts for 5% of Thesis grade. Grading Rubric 4 – Safety- measures performance over 8 specific criteria.*
4. Create construction project cost estimates.
   - *Assessed in BSCI 4990 – Thesis. Project Estimate accounts for 15% of Thesis grade. Grading Rubric 1 – Estimate - measures performance over 5 specific criteria.*
5. Create construction project schedules.
   - *Assessed in BSCI 4990 – Thesis. Project Schedule accounts for 10% of Thesis grade. Grading Rubric 5 – Estimate - measures performance over 5 specific criteria.*
6. Analyze professional decisions based on ethical principles.
   - *Assessed in BSCI 3200 – Construction Communication – Students write a business policy on gifts and entertainment accounts for 10% of overall grade.*
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.

- *Assessed in BSCI 3300 – Field Surveying. Final Examination accounts for 10% of final grade. Field Book accounts for 10% of final grade.*

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.

- *Assessed in BSCI 4990 – Thesis. LEED Assessment accounts for 5% of Thesis grade. Grading Rubric 2 – Sustainability - measures performance over 5 specific criteria.*

19. Understand the basic principles of structural behavior.

- *For Assessed in BSCI 4990 – Thesis. Structural Assessment accounts for 5% of Thesis grade. Grading Rubric 3 – Structural - measures performance over 7 specific criteria.*

20. Understand the basic principles of mechanical, electrical and piping systems

- *Assessed in BSCI 4700 Mechanical Systems in Buildings & BSCI 4750 Electrical Systems in Buildings*
  - *Mechanical Systems are assessed by the Final Examination in BSCI 4700 using multiple format questions such as matching, multiple choice, true/false, short answer, identification and problem solving*
  - *Electrical Systems are assessed by 3 examinations in BSCI 4750 using multiple choice, short answer, true/false and problem solving questions.*
  - *Plumbing Systems are assessed by the Mid-term Examination in BSCI 4700 using multiple format questions such as matching, multiple choice, true/false, short answer, identification and problem solving*

b. Indirectly measure the students' perception of their ability to meet the 20 ACCE Student Learning Outcomes using an exit survey that

assesses how strongly they agree they have met the 20 outcomes - data collected by Administrative Assistant and compiled by School Head.

c. Indirectly measure the student's level of satisfaction with their education and preparation for their career using an exit survey- data collected by Administrative Assistant and compiled by School Head.

- **Objective 2.2: Increase opportunities for students to have an enriching educational experience through involvement in high impact education practices**
    - Measure: Participation in enriching educational experience through involvement in high impact education practicess
        a. Participation in service learning projects (AU Strategic Goal 7B)
            1. Student Exit Survey – Participation in service learning projects - data collected every semester by Administrative Assistant and compiled by School Head.
            2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators – collected by AU Office of Institutional Research & Assessment
        b. Participation in study abroad, student exchange programs
            1. Student Exit Survey – Participation in study abroad, student exchange programs -data collected every semester by Administrative Assistant and compiled by School Head.
            2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators – collected by AU Office of Institutional Research & Assessment
        c. Participation in competition teams
            1. Student Exit Survey – Participation in student competitions --data collected every semester by Administrative Assistant and compiled by School Head.
        d. Participation in ePortfolio program (AU Strategic Goal – 3C)
            1. Student Exit Survey – Participating in ePortfolio program - -data collected every semester by Administrative Assistant and compiled by School Head.
        e. Participation in Industry Internship or co-op
            1. Student Exit Survey – Participation in Industry Internship or co-op - data collected every semester by Administrative Assistant and compiled by School Head.
            2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators – collected by AU Office of Institutional Research & Assessment

5.3 Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry. (AU Strategic Priority 1 – Strategic Goal 1G)

- **Objective 3.1: Enhance advisement & preparedness for a career in construction management**
    - Measure: Enhance advisement & preparedness for a career in construction management
        a. Number of students seeking advisement through BSCI Career Office
            1. Student Exit Surveys – BSCI Career Office advisement -data collected every semester by Administrative Assistant and compiled by School Head.
            2. BSCI Career Office Tracking -data collected every semester by BSCI Career Services Specialist and compiled by School Head.
        b. Number of students submitting Resume's to AU Career Development Center
            1. Student Exit Surveys – Resume submission -data collected every semester by Administrative Assistant and compiled by School Head.
        c. Number of company presentations to students
            1. Student Exit Surveys – Attended Company Presentation - -data collected every semester by Administrative Assistant and compiled by School Head.
            2. BSCI Career Office Tracking -data collected every semester by BSCI Career Services Specialist and compiled by School Head.

- **Objective 3.2: Enhance assistance to students to obtain entry-level construction management positions within the southeast United States and beyond**
    - Measure: Assistance provided to students to obtain entry-level construction management positions within the southeast United States and beyond -data collected every semester by BSCI Career Services Specialist and compiled by School Head.
        a. Number of companies attending campus interviews
            1. BSCI Career Office Tracking
        b. Number of companies attending career expos
            1. BSCI Career Office Tracking
        c. Number of students attending career expos & interviews
            1. BSCI Career Office Tracking
            2. Student Exit Surveys – attending career expos & interviews -data collected every semester by Administrative Assistant and compiled by School Head.

d. Diversity of companies recruiting; commercial, residential, infrastructure, industrial etc.
    1. BSCI Career Office Tracking

- **Objective 3.3: Increase placement of graduates in entry-level positions across diverse sectors of the construction industry.**
    - Measure: Placement of graduates in entry-level positions across diverse sectors of the construction industry
        a. Placement rates within 3 months of graduation.
            1. Student Exit Surveys -data collected every semester by Administrative Assistant and compiled by School Head.
            2. BSCI Career Office Tracking -data collected every semester by BSCI Career Services Specialist and compiled by School Head.
        b. Diversity of companies hiring; Commercial, residential, infrastructure, industrial etc.
            1. Student Exit Surveys -data collected every semester by Administrative Assistant and compiled by School Head.
            2. BSCI Career Office Tracking -data collected every semester by BSCI Career Services Specialist and compiled by School Head.
        c. Diversity of initial hiring position; Pre-construction, project management, field operations etc.
            1. Student Exit Surveys - -data collected every semester by Administrative Assistant and compiled by School Head.
            2. BSCI Career Office Tracking - -data collected every semester by BSCI Career Services Specialist and compiled by School Head.

6. Performance Criteria

The school collected assessment data through Spring 2017 and met at the annual Quality Improvement Meeting on May 9, 2017 to set specific performance criteria for the 2017/18 academic year and beyond.

6.1 Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI (AU Strategic Goal 2)

- **Objective 1.1: Increase the number of high school students accepted to PBSCI**
  - Performance Criteria:
    a. Target 120 Fall Freshman Accepted into PBSCI by 2022
- **Objective 1.2: Increase the number of freshman enrolling in PBSCI**
  - Performance Criteria:
    a. Target 80 Fall Freshman Enrolled into PBSCI by 2022
- **Objective 1.3: Increase the number of unrepresented students in the McWhorter School of Building Science.**
  - Performance Criteria:
    a. Increase Percentage of overall Female, African America, American Indian, Asian and Hispanic students in PBSCI & BSCI by 2% by 2022
- **Objective 1.4: Increase the academic ability of students entering PBSCI & BSCI**
  - Performance Criteria:
    a. Increase Average ACT Scores of incoming PBSCI Fall Freshman to within 0.5 of the AU average.
    b. All students entering the professional program will meet the minimum 2.60 Formula GPA requirement
- **Objective 1.5: Increase the number of students enrolled in PBSCI & BSCI**
  - Performance Criteria:
    a. Increase PBSCI Enrollment
      - Spring – 360
      - Summer – 0
      - Fall - 360
    b. Increase BSCI Enrollment
      - Spring – 210
      - Summer – 60
      - Fall - 210

6.2 Goal 2: The McWhorter School of Building Science will provide an enriching educational experience consistent with the needs of its stakeholders.

- **Objective 2.1: Implement and assess a student learning outcomes based curriculum consistent with the standards of the American Council for Construction**

Education and the needs of stakeholders

Performance Criteria

a. Direct Assessment of Student Learning Outcomes
    1. For each of the assessment measures used to evaluate the student learning outcomes, 70% of the students will achieve an overall score of 70% or above. Any student learning outcome that falls below this threshold for 4 consecutive semesters will be evaluated by a faculty review.
b. Indirect Assessment of Student Learning Outcomes
    1. 80% of graduating students should agree they have met the learning outcomes. Any student learning outcome that falls below this threshold for 4 consecutive semesters will be evaluated by a faculty review.

    2. No more than 10% of graduating students should disagree that they have met the learning outcomes. Any student learning outcome that falls below this threshold for 4 consecutive semesters will be evaluated by a faculty review.

c. Indirectly measure the student's level of satisfaction with their education and preparation for their career
    1. Graduating students should on average be at least *very satisfied* (4 out of 5 on a likert scale) with their education
    2. Graduating students should on average *feel quite a bit prepared* (4 out of 5 on a likert scale) for their career.

- **Objective 2.2: Increase opportunities for students to have an enriching educational experience through involvement in high impact education practices**
    - Performance Criteria
        a. Participation in service learning projects
            1. 100% of graduating students participating in one or more service learning projects. Not meeting this target for 4 consecutive semesters will result in a faculty review.
            2. BSCI mean participation rate is higher than AU over multi-year period.
        b. Participation in study abroad, student exchange programs
            1. 20% of graduating students participating in study abroad, student exchange programs. Not meeting this target for 4 consecutive semesters will result in a faculty review.
            2. BSCI mean participation rate is higher than AU over multi-year period.
        c. Participation in competition teams

1. 30% of graduating students participating in competition teams. Not meeting this target for 4 consecutive semesters will result in a faculty review.

d. Participation in ePortfolio Program
   1. 80% of graduating students creating ePortfolio. Not meeting this target for 4 consecutive semesters will result in a faculty review.

e. Participation in Industry Internship or co-op
   1. 80% of graduating students participating in Industry Internship or co-op. Not meeting this target for 4 consecutive semesters will result in a faculty review.
   2. BSCI mean participation rate is higher than AU over multi-year period.

6.3 Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry. (AU Strategic Priority 1 – Strategic Goal 1G)

- **Objective 3.1: Enhance advisement & preparedness for a career in construction management**
  - Performance Criteria
    a. Number of students seeking advisement through BSCI Career Office
       1. 50% of BSCI graduates sought advisement through BSCI Career Office
    b. Number of students submitting Resume's to AU Career Development Center
       1. 50% of BSCI graduates submited Resume's to AU Career Development Office
    c. Number of company presentations to students
       1. 70% of graduating students attended at least one company presentation
       2. At least 15 companies make presentations during the academic year

- **Objective 3.2: Enhance assistance to students to obtain entry-level construction management positions within the southeast United States and beyond**
  - Performance Criteria
    a. Number of companies attending campus interviews
       1. At least 15 companies attending campus interviews per year
    b. Number of companies attending career expos
       1. At least 70 companies attending the spring and summer career expos.
    c. Number of students attending career expos & interviews
       1. At least 30% of total PBSCI & BSCI enrollment attend career expo per semester

2. At least 20% of BSCI students attend campus interviews per semester

d. Diversity of companies recruiting; commercial, residential, infrastructure, industrial etc.
    1. At least 15% of companies attending career expo are from outside the commercial construction sector

- **Objective 3.3: Increase placement of graduates in entry-level positions across diverse sectors of the construction industry.**
    - Performance Criteria
        a. Placement rates within 3 months of graduation.
            1. 90% of students obtain employment or attend graduate school
        b. Diversity of companies hiring; Commercial, residential, Infrastructure, industrial etc.
            1. 15% of students obtain employment outside of the commercial sector
        c. Diversity of initial hiring position: Pre-construction, project management, field operations etc.
            1. At least 10% of students obtain employment in each of the hiring positions

7. Evaluation Methodology

7.1 Data Collection

1. Data on students accepted into PBSCI & Deposits paid collected October through April – Action – School Head
2. Data on students entering PBSCI and calculation of yield rate collected at start of fall semester – Action - School Head
3. Data on diversity of PBSCI & BSCI students collected early in fall semester - Action – School Head
4. Data on ACT scores of incoming PBSCI students collected each fall semester. Data on incoming formula GPA of BSCI students collected at start of each semester – Action – School Head
5. Data on student enrollment collected each semester – Action OIRA & School Head
6. Data from direct measures for student learning outcomes collected at the end of each semester using grading rubric – Action – Faculty member assessing outcome & Undergraduate Chair
7. Data from undergraduate student surveys collected at the end of each semester – Action – Administrative Assistant & School Head
8. Data from undergraduate student surveys collected at the end of each semester – Action – Administrative Assistant & School Head
9. Data from NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators Survey collected each semester by Office of Institutional Research & Assessment – OIRA & School Head
10. Data from undergraduate student surveys collected at the end of each semester – Action – Administrative Assistant & School Head
11. Data on students seeking advisement and companies interviewing students collected continuously and collated each semester – Action – BSCI Career Services Specialist & School Head
12. Data from undergraduate student surveys collected at the end of each semester – Action – Administrative Assistant & School Head
13. Data on students and companies attending interviews and career expo collected continuously and collated each semester – Action – BSCI Career Services Specialist & School Head
14. Data from undergraduate student surveys collected at the end of each semester – Action – Administrative Assistant & School Head
15. Data on student job placement and diversity of companies hiring students collected each semester – Action – BSCI Career Services Specialist & School Head

7.2 Analysis of Data

The data collected above is collated by the School Head and compiled into a comprehensive report for the preceding calendar year at the end of each spring semester. An annual quality improvement meeting is held in May of every year to review this report and make recommendations for improving the program. Any proposed changes made to the program are developed through the summer and discussed further at the August Retreat. The annual AU Assessment report is submitted to the college in June and the university in July.

8. Data for 2017 Calendar year and previous year's data.

8.1 Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI

8.1.1 Objective 1.1: Increase the number of high school students accepted to PBSCI

8.1.1.1 Measure: Application #'s

a. Number of Accepted PBSCI Students (Track Numbers at end of each month (October to April))

b. Number of PBSCI students paying deposits (Track Numbers at end of each month (November to April))

Year		October	November	January	February	March	April
2013/14	Accepted	28	44	59	73	74	74
	Deposited	12	23	34	38	45	47
2014/15	Accepted	35	51	69	75	77	84
	Deposited	16	26	41	48	54	58
2015/16	Accepted	26	64	80	94	96	96
	Deposited	9	10	38	55	62	63
2016/17	Accepted	37	85	103	104	107	114
	Deposited	13	17	63	67	75	81
2017/18	Accepted	66	99	102			
	Deposited	20	44	46	59		

8.1.1.2 Performance Criteria:

a. Target 120 Fall Freshman Accepted into PBSCI by 2022 – April 2017 114 Students Accepted

8.1.2 Objective 1.2: Increase the number of freshman enrolling in PBSCI

8.1.2.1 Measure: Enrollment #'s, yield rate.

a. Number of PBSCI students enrolling by end of July

b. Yield Rate - % of accepted students that enroll

Year	No. Accepted	No. Enrolled	Yield Rate
Fall 2014	86	59 (37 from 86)	43%
Fall 2015	82	76 (76 from 82)	92.6%
Fall 2016	106	69	65%
Fall 2017	114	81	71%

8.1.2.2 Performance Criteria:

a. Target 80 Fall Freshman Enrolled into PBSCI by 2022 – 81 Enrolled in Fall 2017.

8.1.3 Objective 1.3: Increase the number of unrepresented students in the McWhorter School of Building Science.

8.1.3.1 Measure: #, % of unrepresented groups

a. Percentage of Female students in PBSCI & BSCI

b. Percentage of African America, American Indian, Asian and Hispanic students in PBSCI & BSCI

	Number & Percentage of unrepresented groups in undergraduate program									
Year	Females		African American		American Indian		Asian		Hispanic	
Fall 2014	25	6%	10	2%	5	1%	1	0%	5	1%
Fall 2015	26	6%	9	2%	3	1%	3	1%	8	2%
Fall 2016	32	6%	9	2%	4	1%	6	1%	20	4%
Fall 2017	34	6%	8	1%	4	1%	7	1%	22	4%

8.1.3.2 Performance Criteria:

a. Increase Percentage of overall Female, African America, American Indian, Asian and Hispanic students in PBSCI & BSCI by 2% by 2022 – Target not met.

8.1.4 Objective 1.4: Increase the academic ability of students entering PBSCI & BSCI

8.1.4.1 Measure: Incoming ACT, Formula GPA

a. Average, Min & Max ACT Scores of incoming PBSCI Freshman

b. Average, Min & Max Formula GPA for incoming BSCI students

	ACT Scores of Incoming Freshman			
Year	Average	Min.	Max.	AU Average
Fall 2014	24.60	18	33	27.0
Fall 2015	24.96	19	33	27.3
Fall 2016	26.33	21	32	27.4
Fall 2017	25.7	18	34	27.3

	Formula GPA for incoming BSCI students			
Semester	No. of Applicants	Average	Min.	Max.
Spring 2014		2.92	2.31	3.82
Summer 2014		3.08	2.22	3.76
Fall 2014		3.38	3.06	4.00
Spring 2015		2.98	2.30	3.94
Summer 2015		2.97	2.20	3.72
Fall 2015		3.36	2.50	3.94
Spring 2016	59	3.13	2.38	4.00
Summer 2016	17	3.11	2.22	4.00
Fall 2016	42	3.53	3.12	3.94
Spring 2017	88	3.35	2.94	4.00
Summer 2017	51	3.11	2.84	3.88
Fall 2017	53	3.66	3.36	4.00
Spring 2018	94	3.46	3.14	3.96

8.1.4.2 Performance Criteria:

a. Increase Average ACT Scores of incoming PBSCI Fall Freshman to within 0.5 of the AU average. – Not achieved.
b. All students entering the professional program will meet the minimum 2.60 Formula GPA requirement – Minimum 2.60 Formula GPA required since Fall 2016.

8.1.5 Objective 1.5: Increase the number of students enrolled in PBSCI & BSCI

8.1.5.1 Measure Student Enrollment

	Student Enrollment		
Semester	PBSCI	BSCI	Total
Spring 2014	183	164	357
Summer 2014	60	133	193
Fall 2014	239	161	400
Spring 2015	219	188	407
Summer 2015	45	144	199
Fall 2015	300	173	473
Spring 2016	279	196	475
Summer 2016	60	146	206
Fall 2016	353	186	539
Spring 2017	309	213	522

Summer 2017	40	165	205
Fall 2017	332	226	558
Spring 2018	278	232	510

8.1.5.2 Performance Criteria:

a. Increase PBSCI Enrollment

- Spring – 360 – Spring 2017 = 309
- Summer – 0 – Summer 2017 = 40
- Fall - 360 – Fall = 332

b. Increase BSCI Enrollment

- Spring – 210 - Spring 2017 = 213 – Target Met
- Summer – 60 - Summer 2017 = 165
- Fall - 210 - Fall 2017 = 226 – Target Met

8.2 Goal 2: The McWhorter School of Building Science will provide an enhanced educational experience consistent with the needs of its stakeholders.

8.2.1 Objective 2.1: Implement a student learning outcomes based curriculum consistent with the standards of the American Council for Construction Education and the needs of stakeholders. Full implementation prior by Spring 2020.

8.2.1.1 Measure: Evaluation of Student Learning Outcomes; Direct & Indirect

a. Directly measure the students' ability to meet the 20 ACCE Student Learning Outcomes.

See Appendix A – Data for Assessment of Student Learning Outcomes Reported to Auburn University Director of Academic Assessment

b. Indirectly measure the students' perception of their ability to meet the 20 ACCE Student Learning Outcomes using an exit survey that assesses how strongly they agree they have met the 20 outcomes.

See Appendix A – Data for Assessment of Student Learning Outcomes Reported to Auburn University Director of Academic Assessment

c. Indirectly measure the student's level of satisfaction with their education and preparation for their career using an exit survey. *Using the rating scale shown below, please answer the following question.*

Performance Criteria: Indirectly measure the student's level of satisfaction with their education and preparation for their career

i. Graduating students should on average be at least *very satisfied* (4 out of 5 on a likert scale) with their education

ii. Graduating students should on average *feel quite a bit prepared* (4 out of 5 on a likert scale) for their career.

Fall 2014 (8 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	0	5	3	4.38
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	0	1	2	5	4.50

Spring 2015 (28 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	0	10	18	4.64
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	0	1	8	19	4.64

Summer 2015 (21 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	2	8	11	4.43
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	0	1	6	14	4.62

Fall 2015 (20 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	1	2	8	9	4.25
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	1	3	8	8	4.15

Spring 2016 (21 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average

What is your overall satisfaction with the education you received in the Building Science program?	0	0	2	12	7	4.24
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	2	1	9	9	4.19

Summer 2016 (24 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	2	2	11	9	4.13
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	1	4	12	7	4.04

Fall 2016 (27 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	0	12	14	4.48
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	0	3	9	15	4.44

Spring 2017 (14 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	0	5	9	4.64
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average

How well did your education in Building Science prepare you for your future career?	0	0	3	5	9	4.64

Summer 2017 (10 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
What is your overall satisfaction with the education you received in the Building Science program?	0	0	0	3	7	4.70
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
How well did your education in Building Science prepare you for your future career?	0	0	0	4	6	4.60

Fall 2017 (42 Reporting)	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average	Average >4.0?
What is your overall satisfaction with the education you received in the Building Science program?	0	0	1	19	22	4.50	Yes
	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average	Average >4.0?
How well did your education in Building Science prepare you for your future career?	0	0	3	23	16	4.31	Yes

Semester	Percentage of Students			
	Very satisfied	*Slightly satisfied*	*Quite a bit prepared*	*Little bit prepared*
Fall 2014	100%	0%	88%	0%
Spring 2015	100%	0%	96%	0%
Summer 2015	90%	0%	95%	0%
Fall 2015	85%	0%	80%	5%
Spring 2016	90%	0%	86%	10%
Summer 2016	83%	8%	79%	4%
Fall 2016	100%	0%	89%	0%
Spring 2017	100%	0%	100%	0%

Summer 2017	100%	0%	100%	0%
Fall 2017	98%	0%	93%	0%

8.1.2 Objective 2.2: Increase opportunities for students to have an enriching educational experience through involvement in high impact education practices

8.1.2.1 Measure: Participation in enriching educational experience through involvement in high impact education practices

d. Participation in service learning projects (AU Strategic Goal 7B)

1. Student Exit Survey – Participation in service learning projects - *The McWhorter School strives to provide an Enriching Educational Experience for Building Science students by providing a number of opportunities for students outside of the classroom. The following questions inquire about your participation in Enriching Educational Experiences.*

a. Did you participate in a service learning experience as part of a BSCI class?	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	25	3	89%
Summer 2015	20	1	95%
Fall 2015	20	0	100%
Spring 2016	19	2	90%
Summer 2016	23	1	96%
Fall 2016	26	1	96%
Spring 2017	14	0	100%
Summer 2017	9	1	90%
Fall 2017	39	3	93%

2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators - *In your experience at your institution during the current school year, about how often have you done each of the following? 1=Never, 2=Sometimes, 3=Often, 4=Very often*

		Mean Response			BSCI > AU?
	Year	BSCI	CADC	AU	
	2013/FY	1.88	1.71	1.60	Yes

Participated in a community-based project (e.g. service learning) as part of a regular course	2013/SY	2.31	2.13	1.79	Yes
	2015/FY	1.75	1.47	1.46	Yes
	2015/SY	2.12	1.96	1.67	Yes
	2016/FY	1.50	1.47	1.43	Yes
	2016/SY	2.11	1.94	1.66	Yes
About how many of your courses at this institution have included a community-based project (service-learning)	2017/FY	1.64	1.50	1.46	Yes
	2017/SY	2.16	1.97	1.65	Yes

d. Participation in study abroad, student exchange programs

1. Student Exit Survey – Participation in study abroad, student exchange programs - *The McWhorter School strives to provide an Enriching Educational Experience for Building Science students by providing a number of opportunities for students outside of the classroom. The following questions inquire about your participation in Enriching Educational Experiences.*

-

b. Did you participate in a study abroad program or another international experience as part of the Building Science Program?	Yes	No	% Participation
Fall 2014	3	5	37.5%
Spring 2015	3	25	11%
Summer 2015	7	14	33%
Fall 2015	3	17	15%
Spring 2016	6	15	29%
Summer 2016	7	17	29%
Fall 2016	5	22	19%
Spring 2017	8	6	57%
Summer 2017	7	3	70%
Fall 2017	20	32	24%

2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators - *Which of the following have you done or do you plan to do*

before you graduate from your institution? (Recoded: 0=Have not decided, Do not plan to do, Plan to do; 1=Done. Thus, the mean is the proportion responding "Done" among all valid respondents.)

		Mean Response			BSCI >AU?
	Year	BSCI	CADC	AU	
Study Abroad Program	2013/FY	0.02	0.01	0.01	Yes
	2013/SY	0.09	0.28	0.13	No
	2015/FY	50%	62%	28%	Yes
	2015/SY	52%	59%	39%	Yes
	2016/FY	38%	68%	45%	Nos
	2016/SY	52%	63%	28%	Yes
	2017/FY	36%	66%	46%	No
	2017/SY	52%	62%	27%	Yes

d. Participation in competition teams

1. Student Exit Survey – Participation in student competitions - *The McWhorter School strives to provide an Enriching Educational Experience for Building Science students by providing a number of opportunities for students outside of the classroom. The following questions inquire about your participation in Enriching Educational Experiences.*

c. Did you participate in a student competition while you were in the Building Science Program?	Yes	No	% Participation
Fall 2014	5	3	62.5%
Spring 2015	17	11	61%
Summer 2015	10	11	48%
Fall 2015	6	14	30%
Spring 2016	8	13	38%
Summer 2016	7	17	29%
Fall 2016	9	18	33%
Spring 2017	6	8	43%
Summer 2017	2	8	20%
Fall 2017	17	25	40%

d. Participation in ePortfolio program (AU Strategic Goal – 3C)

1. Student Exit Survey – Participating in ePortfolio program - *The McWhorter School strives to provide an Enriching Educational Experience for Building Science students by providing a number of opportunities for students outside of the classroom. The following questions inquire about your participation in Enriching Educational Experiences.*

d. Did you create an ePortfolio while you were in the Building Science Program?	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	28	0	100%
Summer 2015	17	4	81%
Fall 2015	20	0	100%
Spring 2016	21	0	100%
Summer 2016	18	6	75%
Fall 2016	24	3	89%
Spring 2017	13	1	93%
Summer 2017	10	0	100%
Fall 2017	40	2	95%

e. Participation in Industry Internship or Co-op

1. Student Exit Survey – Participation in Industry Internship or co-op - *The McWhorter School strives to provide an Enriching Educational Experience for Building Science students by providing a number of opportunities for students outside of the classroom. The following questions inquire about your participation in Enriching Educational Experiences.*

e. Did you participate in an industry internship or co-op while you were in the Building Science Program?	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	25	3	89%
Summer 2015	18	3	86%
Fall 2015	19	1	95%
Spring 2016	17	4	81%
Summer 2016	21	3	88%

Fall 2016	25	2	93%
Spring 2017	12	1	86%
Summer 2017	10	0	100%
Fall 2017	35	7	83%

2. NSSE (National Survey of Student Engagement) Multi-Year Benchmark Indicators - *Which of the following have you done or do you plan to do before you graduate from your institution? (Recoded: 0=Have not decided, Do not plan to do, Plan to do; 1=Done. Thus, the mean is the proportion responding "Done" among all valid respondents.)*

		Mean Response			BSCI > AU?
	Year	BSCI	CADC	AU	
Practicum, internship, field experience, co-op experience, or clinical assignment	2013/FY	0.10	0.05	0.04	Yes
	2013/SY	0.76	0.60	0.51	Yes
	2015/FY	75%	84%	87%	Yes
	2015/SY	93%	87%	77%	Yes
	2016/FY	88%	86%	87%	Yes
	2016/SY	93%	85%	77%	Yes
	2017/FY	91%	88%	87%	Yes
	2017/SY	94%	87%	78%	Yes

8.3 Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry. (AU Strategic Priority 1 – Strategic Goal 1G)

8.3.1 Objective 3.1: Enhance advisement & preparedness for a career in construction management

8.3.1.1 Measure: Enhance advisement & preparedness for a career in construction management

a. Number of students seeking advisement through BSCI Career Office

1. Student Exit Surveys – BSCI Career Office advisement

Did you seek advisement through BSCI Career Office?	Yes	No	% Participation
Fall 2014	7	1	87.5%
Spring 2015	20	8	71.4%
Summer 2015	13	8	62%
Fall 2015	10	10	50%
Spring 2016	15	6	71%
Summer 2016	6	18	25%
Fall 2016	22	5	81%
Spring 2017	5	9	36%
Summer 2017	6	4	60%
Fall 2017	23	19	55%

2. BSCI Career Office Tracking

Semester	No. of students advised per. semester			
	PBSCI	BSCI	GRAD	OTHER
Spring 2015	13	11	4	0
Summer 2015	0	1	1	0
Fall 2015	34	19	7	4
Spring 2016	15	16	1	4
Summer 2016	2	0	2	1
Fall 2016	15	14	13	1
Spring 2017	9	29	1	3
Summer 2017	0	3	3	0
Fall 2017	25	14	3	1

b. Number of students submitting Resume's to AU Career Development Center

1. Student Exit Surveys – Resume submission

Did you submit a Resume to AU Career Development Center?	Yes	No	% Participation
Fall 2014	5	3	62.5%
Spring 2015	14	14	50%
Summer 2015	12	9	57%
Fall 2015	13	7	65%
Spring 2016	13	8	62%
Summer 2016	12	12	50%
Fall 2016	9	18	33%
Spring 2017	0	14	0%
Summer 2017	5	5	50%
Fall 2017	13	29	31%

c. Number of company presentations to students

1. Student Exit Surveys – Attended Company Presentation

Did you attend a company presentation in Gorrie prior to attending an on campus interview?	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	24	4	86%
Summer 2015	14	7	67%
Fall 2015	18	2	90%
Spring 2016	17	4	81%
Summer 2016	17	7	71%
Fall 2016	20	7	74%
Spring 2017	10	4	72%
Summer 2017	8	2	80%
Fall 2017	25	17	60%

2. BSCI Career Office Tracking

Semester	Number each semester	
	Companies presenting	Students attending
Fall 2014	14	144
Spring 2015	11	133
Summer 2015	0	0

Fall 2015	8	64
Spring 2016	7	92
Summer 2016	0	0
Fall 2016	10	88
Spring 2017	8	77
Summer 2017	0	0
Fall 2017	5	55

8.3.1 Objective 3.2: Enhance assistance to students to obtain entry-level construction management positions within the southeast United States and beyond

8.3.2.1 Measure: Assistance provided to students to obtain entry-level construction management positions within the southeast United States and beyond

h. Number of companies attending campus interviews

1. BSCI Career Office Tracking

Semester	Number of companies attending campus interviews (not inc. expo)
Fall 2014	14
Spring 2015	11
Summer 2015	1
Fall 2015	7
Spring 2016	6
Fall 2016	11
Spring 2017	9
Fall 2017	5
Spring 2018	5

i. Number of companies attending career expos

1. BSCI Career Office Tracking

Semester	Number of companies attending BSCI Career Expo
Fall 2014	62
Spring 2015	60
Summer 2015	22
Fall 2015	77
Spring 2016	72
Summer 2016	21
Fall 2016	85
Spring 2017	77
Summer 2017	19

Fall 2017	90
Spring 2018	70

j. Number of students attending career expos & campus interviews

1. BSCI Career Office Tracking

Semester	Number of students attending BSCI Career Expo				
	PBSCI	BSCI	MBC/MIDC	Other	Total
Fall 2014	147	103	17	57	324
Spring 2015	47	78	17	68	210
Summer 2015		64		2	66
Fall 2015	171	101	17	61	350
Spring 2016	94	104	7	65	270
Summer 2016					37
Fall 2016	161	86	15	67	326
Spring 2017					286
Summer 2017		82	16	0	98
Fall 2017	183	122	11	95	411
Spring 2018	82	78	6	75	241

Semester	Number of students attending campus interviews (not inc. expo)				
	PBSCI	BSCI	MBC/MIDC	Other	Total
Fall 2014					144
Spring 2015					125
Summer 2015		2		2	4
Fall 2015					48
Spring 2016					80
Summer 2016					
Fall 2016					85
Spring 2017					62
Summer 2017					
Fall 2017	8	36	5	1	50
Spring 2018					20

2. Student Exit Surveys – attending career expos & interviews

Fall 2014	Yes	No	% Participation
Did you attend a company interview in Gorrie?	8	0	100%
Did you attend a BSCI Career Expo?	7	0	100%

Spring 2015	Yes	No	% Participation

Did you attend a company interview in Gorrie?	24	4	86%
Did you attend a BSCI Career Expo?	27	1	96%

Summer 2015	Yes	No	% Participation
Did you attend a company interview in Gorrie?	12	9	57%
Did you attend a BSCI Career Expo?	20	1	95%

Fall 2015	Yes	No	% Participation
Did you attend a company interview in Gorrie?	15	5	75%
Did you attend a BSCI Career Expo?	20	0	100%

Spring 2016	Yes	No	% Participation
Did you attend a company interview in Gorrie?	14	7	67%
Did you attend a BSCI Career Expo?	21	0	100%

Summer 2016	Yes	No	% Participation
Did you attend a company interview in Gorrie?	14	10	58%
Did you attend a BSCI Career Expo?	24	0	100%

Fall 2016	Yes	No	% Participation
Did you attend a company interview in Gorrie?	19	8	70%
Did you attend a BSCI Career Expo?	25	2	93%

Spring 2017	Yes	No	% Participation
Did you attend a company interview in Gorrie?	9	5	65%
Did you attend a BSCI Career Expo?	13	1	93%

Summer 2017	Yes	No	% Participation
Did you attend a company interview in Gorrie?	6	4	60%

Did you attend a BSCI Career Expo?	10	0	100%

Fall 2017	Yes	No	% Participation
Did you attend a company interview in Gorrie?	20	22	48%
Did you attend a BSCI Career Expo?	41	1	98%

k. Diversity of companies recruiting; commercial, residential, infrastructure, industrial etc.
   1. BSCI Career Office Tracking

Semester	Sector of industry –recruiting on campus				
	Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	66%	3%	6%	9%	16%
Spring 2015	66%	2%	11%	9%	12%
Summer 2015	83%	4%	4%	0%	9%
Fall 2015	72%	9%	6%	3%	10%
Spring 2016	69%	8%	3%	3%	17%
Summer 2016	80%	10%	0%	0%	10%
Fall 2016	71%	7%	4%	4%	14%
Spring 2017	67%	14%	12%	4%	9%
Summer 2017	74%	5%	5%	0%	16%
Fall 2017	51%	8%	16%	11%	13%
Spring 2018	64%	10%	7%	0%	19%

8.3.3 **Objective 3.3: Increase placement of graduates in entry-level positions across diverse sectors of the construction industry.**

8.3.3.1 <u>Measure: Placement of graduates in entry-level positions across diverse sectors of the construction industry</u>

c. Placement rates within 3 months after graduation.
   1. Student Exit Surveys

Have you formally accepted a job offer or plan to go to graduate school?	Yes	No	% Participation

Fall 2014	8	0	100%
Spring 2015	27	1	96%
Summer 2015*	19	2	90%
Fall 2015	18	2	90%
Spring 2016* (3 graduate school)	17	4	81%
Summer 2016* (1 graduate school)	20	4	83%
Fall 2016*(1 graduate school)	23	4	85%
Spring 2017	11	3	78%
Summer 2017	7	3	70%
Fall 2017* (5 graduate school)	39	3	93%

	No. of Formal Job Offers		
Year	Average	Min.	Max.
Fall 2014	1.75	1	3
Spring 2015	2.04	1	4
Summer 2015	1.67	0	5
Fall 2015	2.10	1	6
Spring 2016	2.29	0	6
Summer 2016	2.09	0	5
Fall 2016	1.41	0	3
Spring 2017	2.07	0	5
Summer 2017	1.50	0	3
Fall 2017	1.95	0	7

2. BSCI Career Office Tracking

Semester	Students Interviewed	Job offer or grad school	Placement
Fall 2014	19	19	100%
Spring 2015	29	29	100%
Summer 2015	24	24	100%
Fall 2015	26	26	100%
Spring 2016	30	30	100%

Summer 2016	29	29	100%
Fall 2016	41	41	100%
Spring 2017	31	27	90%
Summer 2017	22	16	77%
Fall 2017	49	44	90%

d. Diversity of companies hiring; Commercial, residential, infrastructure, industrial etc.

1. Student Exit Surveys

	Sector of industry				
Year	Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	87.5%	0%	0%	12.5%	
Spring 2015	92.9%	3.6%	0%	3.6%	
Summer 2015	81.0%	14.3%	0%	4.8%	
Fall 2015	95%	5%	0%	0%	
Spring 2016	81%	5%	10%	5%	
Summer 2016	88%	8%	4%	0%	
Fall 2016	75%	4%	4%	4%%	12%
Spring 2017	86%	7%	0%	7%	0%
Summer 2017	90%	0%	0%	0%	0%
Fall 2017	83%	5%	5%	7%	0%

2. BSCI Career Office Tracking

	Sector of industry				
Year	Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	94.5%	0%	0%	5.5%	
Spring 2015	93%	3.5%	3.5%	0%	

Summer 2015	90%	10%	0%	0%	
Fall 2015	88%	4%	4%	4%	
Spring 2016	96%	0%	0%	4%	
Summer 2016	85%	5%	5%	5%	
Fall 2016	64%	20%	0%	0%	16%
Spring 2017	73%	4%	4%	0%	19%
Summer 2017	86%	7%	0%	0%	7%
Fall 2017	80%	2%	2%	0%	16%

e. Diversity of initial hiring position; Pre-construction, project management, field operations etc.

1. Student Exit Surveys

	Initial Hiring Position		
Year	Pre-construction	Project Management	Field Operations
Fall 2014	25%	62.5%	12.5%
Spring 2015	14.3%	67.9%	17.9%
Summer 2015	19.0%	47.6%	33.3%
Fall 2015	5%	45%	50%
Spring 2016	14%	48%	38%
Summer 2016	8%	58%	33%
Fall 2016	11%	70%	19%
Spring 2017	0%	50%	50%
Summer 2017	10%	50%	40%
Fall 2017	12%	67%	21%

2. BSCI Career Office Tracking

	Initial Hiring Position

Year	Pre-construction	Project Management	Field Operations	Unknown
Fall 2014	17%	66%	17%	0%
Spring 2015	7%	84%	7%	0%
Summer 2015	10%	41%	18%	31%
Fall 2015	4%	23%	54%	31%
Spring 2016	4%	57%	35%	4%
Summer 2016	5%	46%	29%	20%
Fall 2016	7%	22%	39%	29%
Spring 2017	0%	19%	55%	26%
Summer 2017	7%	40%	53%	0%
Fall 2017	10%	41%	21%	28%

9. Annual Quality Improvement Meeting – May 4, 2018

The Minutes from the May 9, 2017 Quality Improvement Meeting are attached to this document as Appendix C.

10. Update on Previous Quality Improvement Initiatives

Three updates on previous quality improvement initiatives are presented in Appendix D, E & F. These were discussed at the annual quality improvement meeting on May 4 2018 and show up as the 2nd item in the minutes in Appendix C.

Appendix A – Data for Assessment of Student Learning Outcomes Reported to the Auburn University Director of Academic Assessment – July 2018

BS in Building Science (BSCI)

Student Learning Outcomes

The Building Science (BSCI) program is accredited by the American Council for Construction Education (ACCE). The program has been continuously accredited since 1980 and was last reaccredited in 2014. The program will be re-accredited in 2020. The ACCE is implementing a new learning outcomes based standard that will become affective for all programs being accredited from Fall 2016 onwards. The McWhorter School of Building Science has recently completed a curriculum review and the new curriculum will be effective to PBSCI students entering the professional BSCI program from summer 2017 onward and for freshman entering the PBSCI program from Fall 2017 onward.

1. <u>Specificity of Outcomes</u>

Please provide a list of program level student learning outcomes. Student learning outcomes articulate the knowledge, skills, and abilities that students are expected to achieve as a result of completing the academic degree program.

In accordance with ACCE Document 103: *Standards and Criteria for Accreditation of Postsecondary Construction Education Degree Programs - 3.2.2.2 Student Learning Outcomes applicable to 4-year degree programs*, the following 20 Student Learning Outcomes are applicable to the Building Science Program:
Note: In defining the learning outcomes for a 4-year degree programs, the following verbs consistent with Bloom's taxonomy are used:
Remember: The lowest level of the taxonomy requires students to do very little with the information they are learning. They may be asked to recall, list, or name an idea or concept.
Understand: At the next level, students demonstrate that they understand the content by explaining, summarizing, classifying, or translating the given information.
Apply: At this level, students begin to put the information they are learning into context. Here they are able to integrate ideas across multiple situations, or utilize the content in a new way.

Analyze: Students begin to develop higher order thinking. They may be asked to compare and contrast or take a concept and break it into parts to explore the relationships present.
Evaluate: At this stage, students are asked to judge an idea. This may involve predicting, experimenting, critiquing, or making an argument from evidence.
Create: At the highest level, students are producing new ideas or products that integrate the knowledge they have gained. When students are involved in creating new artifacts, they are actively engaged in the subject matter.

Upon graduation from an accredited ACCE 4-year degree program, a graduate shall 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

2. <u>Comprehensive Outcomes</u>

Please provide a brief narrative stating whether or not the list of student learning outcomes is comprehensive (i.e., the student learning outcomes accurately reflect

the current scope of the program). Consider also providing a rationale for the degree/nature of comprehensiveness (e.g., student learning outcomes are aligned with disciplinary standards).

Because they match disciplinary standards established by the accrediting agency ACCE, the current list of student learning outcomes is comprehensive and accurately reflects the current scope of the program.

3. **Communicating Outcomes**

Please provide a brief statement describing if and how the list of student learning outcomes is shared with others (e.g., paper copies are shared with program faculty at a meeting, the outcomes are posted to the departmental website at: http://cadc.auburn.edu/construction/construction-degrees-programs/accreditation).

The Student Learning outcomes are communicated to stakeholders in the following manner:

i. Students.

The Student Learning Outcomes, together with the Goals and Objectives for the program are set out in the Accreditation section of the school's website and are distributed to all students attending Camp War Eagle as freshmen and/or when they meet with their advisor for the first time as transfer students. Students are also informed of the student learning outcomes during the Pre-Building Science Convocation which is held during their first semester of study and during the Professional Program Convocation that is held during the first semester of their junior year.

ii. Faculty.

An introduction to assessment, accreditation and student learning outcomes is provided to all new BSCI faculty as part of the new faculty orientation process. Existing faculty are informed of the student learning outcomes during faculty meetings and via email correspondence. All faculty are involved in the curriculum review process and documents detailing the student learning outcomes play a central part in this process. All faculty are required to evaluate and grade the Building Science Thesis which is currently used to evaluate five of the 20 student learning outcomes.

iii. Industry Advisory Council Members.

To satisfy the ACCE requirements, the school is required to have an Industry Advisory Council which consists of approximately 25 members consisting of senior level managers drawn from construction companies across the region and beyond. Members of the IAC are made aware of the student learning outcomes in two ways. First, members of the IAC were involved in two curriculum review workshops held in July 2015 where they

were presented with the list of SLO's and asked to review for completeness and the need for any additional SLO's. Secondly, IAC members are given an abridged version of our annual assessment report at their spring and fall meeting which also contains details of the SLO's. See attachment Assessment Data IAC Meeting Spring 2017.pdf.

Curriculum Map

4. Curriculum Map:

Please provide a curriculum map that visually represents the alignment between student learning outcomes and required courses/experiences.

See Appendix A.

Measurement

5. Outcome-Measure Alignment

Please provide a description of the assessment measures, noting how they were chosen/developed to align with the student learning outcomes.

The assessment of the 20 American Council for Construction Education (ACCE) Student Learning Outcomes is one of the measures used to evaluate Objective 2.1: *Implement and assess a student learning outcomes based curriculum consistent with the standards of the American Council for Construction Education and the needs of stakeholders.* The outcomes are evaluated using both direct and indirect measures as set out below. Faculty with subject matter expertise develop the assessment measures and accompanying grading rubrics and these are reviewed by the chair of the undergraduate program and the school head.

The table below sets out how each of the outcomes are directly assessed currently and how we plan to assess them after the introduction of the new curriculum:

Student Learning Outcome	Where & How Assessed	Implementation Date
1. Create written communications appropriate to the construction discipline.	BSCI 3200 Construction Communication (First Semester, Junior Year)– Written Documents & Case Study (30% of course grade)	Summer 2017

2. Create oral presentations appropriate to the construction discipline.	BSCI 3200 Construction Communication (First Semester, Junior Year)– Oral Presentations (15% of course grade)	Fall 2016
3. Create a construction project safety plan.	BSCI 4990 – Thesis (2nd Semester, Senior Year). Safety Plan accounts for 5% of Thesis grade.	Fall 2014
4. Create construction project cost estimates.	BSCI 4990 – Thesis (2nd Semester, Senior Year). Project Estimate accounts for 15% of Thesis grade	Fall 2014
5. Create construction project schedules.	BSCI 4990 – Thesis (2nd Semester, Senior Year). Scheduling Assessment accounts for 10% of Thesis grade.	Fall 2015
6. Analyze professional decisions based on ethical principles.	BSCI 3200 – Construction Communication (First Semester, Junior Year)- Written Company Ethics Policy on Gifts and Entertainment – 5% of course grade	Fall 2017
7. Analyze construction documents for planning and management of construction processes.	BSCI 4990 – Thesis (2nd Semester, Senior Year). Construction Documents Assessment accounts for 10% of Thesis grade.	Fall 2018
8. Analyze methods, materials, and equipment used to construct projects.	BSCI 4350 - Construction Project Analysis (First Semester, Senior Year). Project Method Statement accounts for 35% of course grade	Fall 2018
9. Apply construction management skills as a member of a multi-disciplinary team.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). Collaborative Project accounts for 15% of course grade	Spring 2018
	New curriculum - BSCI 3440, Structure of Buildings (First Semester, Junior Year) – II. Team Project	Fall 2018
10. Apply electronic-based technology to manage the construction process.	BSCI 4500 - Information and Communication Technology for Construction (CIT) (First Semester, Senior Year). – 2. Final Project accounts for 20% of course grade	Fall 2018

11. Apply basic surveying techniques for construction layout and control.	BSCI 3300 – Field Surveying. Final Examination (First Semester, Junior Year) accounts for 10% of final grade. Field Book accounts for 10% of final grade	Summer 2016
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	BSCI 3800 (2nd Semester, Junior Year) – Contracting Business. Test 4 accounts for 24% of course grade.	Spring 2018
13. Understand construction risk management.	BSCI 4850 Construction Law and Risk Management (2nd Semester, Senior Year). – Specific questions on Tests 2 & 3. Tests 2 & 3 account for 50% of course grade	Fall 2018
14. Understand construction accounting and cost control.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). – Specific questions on Tests 2 & 3. Tests 2 & 3 account for 30% of course grade	Fall 2018
15. Understand construction quality assurance and control.	BSCI 4350 Construction Project Analysis (First Semester, Senior Year). Quiz 2 accounts for 30% of course grade.	Fall 2018
16. Understand construction project control processes.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). – Specific questions on Tests 3. Test 3 accounts for 15% of course grade	Fall 2018
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.	BSCI 4850 Construction Law and Risk Management (2nd Semester, Senior Year). – Specific questions on Tests 1, 2 & 3. Tests 1, 2 & 3 account for 75% of course grade	Fall 2018
18. Understand the basic principles of sustainable construction.	BSCI 4990 – Thesis (2nd Semester, Senior Year). LEED Assessment accounts for 5% of Thesis grade	Fall 2014

19. Understand the basic principles of structural behavior.	Current Curriculum - BSCI 4990 – Thesis (2nd Semester, Senior Year). Structural Assessment accounts for 5% of Thesis grade	Fall 2014
	New curriculum - BSCI 3440, Structure of Buildings (First Semester, Junior Year) – II. Final examination accounts for 20% of course grade.	Fall 2018
20. Understand the basic principles of mechanical, electrical and piping systems	BSCI 4700 Mechanical Systems in Buildings (2nd Semester, Junior Year). Mid-term and final examination accounts for 40% of course grade. BSCI 4750 Electrical Systems (2nd Semester, Junior Year) in Buildings. Three examinations accounts for 90% of course grade.	Fall 2016

6. Direct Measures

Please consider indicating which assessments are direct measures of student learning (e.g., exams, rubric scores).

Following the ACCE's development of the 20 Student Learn Outcomes, Auburn's BSCI program has worked to develop and adopt appropriate direct measures. The first work was assessed in Spring 2016, and development is continuing through Fall 2018. The following identifies the time specific measures were assessed along with the detail of those measures.

2016

For the spring semester of 2016 the following ACCE Student Learning Outcomes were assessed using direct measures (Numbering system reflects ACCE Student Learning Outcomes):

No. 3 *Create a construction project safety plan*

No. 4 *Create construction project cost estimates*

No. 5 *Create construction project schedules*

No. 18 *Understand the basic principles of sustainable construction*

No. 19 *Understand the basic principles of structural behavior*

All of the above outcomes are assessed as part of BSCI 4990 – Thesis. All graduating seniors are required to take this class. Grading rubrics are used to assess each outcome. The accompanying document *BSCI 4990 Rules & Regulations 2016.docx* sets out the assessment requirements for the 5 outcomes assessed in BSCI 4990 and also contains the 5 grading rubrics used.

In summer 2016 the following ACCE Student Learning Outcome was assessed in BSCI 3300 Field Surveying for the first time:

No. 11 Apply basic surveying techniques for construction layout and control.

This outcome is assessed in BSCI 3300 – Field Surveying. Two measures are reported, individual student performance in the comprehensive final examination which accounts for 10% of final grade. The comprehensive final examination consists of a mixture short true/false and multiple choice questions, together with a number of short and longer calculation problems that evaluate basic surveying techniques for construction layout and control. The second measure is the students individual grade for the completion of their surveying field book which also accounts for 10% of final grade

In addition to the five outcomes assessed in the spring, the following two ACCE Student Learning Outcome was assessed for the first time during the fall 2016 semester.:

In BSCI 4700 Mechanical Systems in Buildings & BSCI 4750 Electrical Systems in Buildings:

No. 20 Understand the basic principles of mechanical, electrical and piping systems

This outcome is assessed in BSCI 4700 Mechanical Systems in Buildings & BSCI 4750 Electrical Systems in Buildings

Mechanical Systems are assessed by the Final Examination in BSCI 4700 using multiple format questions such as matching, multiple choice, true/false, short answer, identification and problem solving

Electrical Systems are assessed by 3 examinations in BSCI 4750 using multiple choice, short answer, true/false and problem solving questions.

Plumbing Systems are assessed by the Mid-term Examination in BSCI 4700 using multiple format questions such as matching, multiple choice, true/false, short answer, identification and problem solving

In BSCI 3200 Construction Communication

No. 2. Create oral presentations appropriate to the construction discipline

This outcome is assessed in BSCI 3200 Construction Communication. A case study presentation accounts for 15% of final grade. Oral Presentation Rubric (*Oral Communication Rubric.pdf*) measures performance over 5 specific criteria

2017

With the new curricula starting in Summer 2017, we continue to roll out direct measures of all 20 learning outcomes. During the Summer and Fall 2017 semesters we added the following direct measures:

In BSCI 3200 Construction Communication

No. 1. Create written communications appropriate to the construction discipline.

This outcome is assessed in BSCI 3200 Construction Communication (First Semester, Junior Year)– Written Documents & Case Study (30% of course grade) Writing Rubric (*Written Communication Rubric.pdf*) - measures performance over 5 specific criteria.

No. 6 Analyze professional decisions based on ethical principles.

This outcome is assessed in BSCI 3200 – Construction Communication – Students write a business policy on gifts and entertainment accounts for 10 % of overall grade.

6a. **Indirect Measures**

An exit survey administered to all graduating seniors indirectly measure the students' perception of their ability to meet the 20 ACCE Student Learning Outcomes. The exit survey assesses how strongly they agree they have met the 20 outcomes.

7. Data Collection

Please provide a description of the assessment data collection process (i.e., information on how data were collected, who provided data, and the pertinent methodological details such as rating/scoring design).

Data for both direct and indirect measures are collected each semester. Grading rubrics for each of the SLO's directly assessed in BSCI 4990 are completed by the faculty grading each student thesis individually. Completed rubrics are collated by the school head into a spreadsheet and this is used to compile the results set out below. Grading rubrics for data collected in BSCI 3200, BSCI 3300, BSCI 4700 & BSCI 4750 is collected by the faculty teaching the course and passed to the school head for compilation. The exit survey is administered to all graduating seniors each semester approximately 3 weeks before graduation and they are sent reminders to complete the survey.

Results

8. Reporting Results

Please provide assessment results aligned with the student learning outcomes. If historical assessment data is available, consider providing this data to reveal any student learning trends.

The results from both direct and indirect assessment for semesters Fall 2014 through Fall 2017 are set out below.

Performance Criteria for student learning outcomes were established by the BSCI Faculty at the BSCI Quality Improvement Meeting held on May 9, 2017. For direct assessment of Student Learning Outcomes: For each of the assessment measures used to evaluate the student learning outcomes, 70% of the students will achieve an overall score of 70% or above. Any student learning outcome that falls below this threshold for 4 consecutive semesters will be evaluated by a faculty review. From Fall 2017 any assessment measure not meeting this criteria will be highlighted in **RED.**

a. ACCE SLO #1 - Create written communications appropriate to the construction discipline.

In Summer 2017 assessed in BSCI 3200 Construction Communication. Two dedicated writing assignments (30% of course grade). Writing Rubric - measures performance over 5 specific criteria.

Summer 2017 (New Curriculum) Presentations 1 & 2	**Grading Scale**												**Average**	
	5		**4**		**3**		**2**		**1**		**0**			
Context	31	10	2	22	0	0	0	0	0	0	0	0	**4.95**	**4.58**
Content	21	0	8	32	3	0	1	0	0	0	0	0	**4.55**	**4.42**
Conventions	20	5	9	27	4	0	0	0	0	0	0	0	**4.56**	**4.33**
Sources	22	5	11	27	0	0	0	0	0	0	0	0	**4.68**	**4.41**
Syntax	20	5	10	27	3	0	0	0	0	0	0	0	**4.62**	**4.29**
												Total (94.24%, 88.08%)	**23.56**	**22.02**

Fall 2017 (New Curriculum) Presentations 1 & 2	**Grading Scale**												**Average**	
	5		**4**		**3**		**2**		**1**		**~~0~~**			
Context	15	21	14	9	1	0	0	0	0	0	0	0	**4.48**	**4.75**
Content	17	10	11	10	2	8	0	2	0	0	0	0	**4.50**	**4.02**
Conventions	14	15	14	10	2	5	0	0	0	0	0	0	**4.42**	**4.39**

Clarity	10	19	13	10	7	1	0	0	0	0	0	0	**4.20**	**4.63**
Syntax	23	30	6	0	0	0	0	0	0	0	0	0	**4.82**	**5.00**
												Total	**22.42**	**22.79**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Summer 2017	100%	100%	94%	28%
Fall 2017	100%	97%	93%	84%

Semester	**Lowest ranked criteria**
Summer 2017	*Content*
Fall 2017	*Content*

b. **ACCE SLO #2 - Create oral presentations appropriate to the construction discipline.**

In Fall 2016 assessed in BSCI 3200 Construction Communication. Case Study Presentation accounts for 15% of final grade. Oral Presentation Rubric - measures performance over 5 specific criteria. From summer 2017 assessed in BSCI 3200 Construction Communication. Since Fall 2017, one oral presentation account for 15% of final grade. Oral Presentation Rubric - measures performance over 5 specific criteria.

Fall 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Central Message	14	10	1	0	0	0	**4.41**
Organization	16	9	0	0	0	0	**4.43**
Delivery	13	10	2	0	0	0	**4.29**
Content	20	5	0	0	0	0	**4.61**
Language	21	4	0	0	0	3	**4.78**
					Total (90.09%)		**22.52**

Spring 2017	**Grading Scale**	**Average**

	5	4	3	2	1	0	
Central Message	5	4	1	0	0	0	**4.4**
Organization	3	6	1	0	0	0	**4.2**
Delivery	3	4	3	0	0	0	**4.0**
Content	6	4	0	0	0	0	**4.6**
Language	8	2	0	0	0	0	**4.8**
					Total (88%)		**22**

Summer 2017 (New Curriculum) Presentations 1 & 2	**Grading Scale**												**Average**	
	5		**4**		**3**		**2**		**1**		**0**			
Central Message	18	33	12	0	3	0	0	0	0	0	1	0	**4.33**	**5.00**
Organization	20	16	12	17	1	0	0	0	0	0	1	0	**4.44**	**4.60**
Delivery	11	11	17	5	4	17	0	0	0	0	1	0	**4.10**	**4.14**
Content	20	11	12	22	1	0	0	0	0	0	1	0	**4.44**	**4.33**
Language	17	27	15	6	1	0	0	0	0	0	1	0	**4.36**	**4.82**
											Total (86.68%,91.56%)		**21.67**	**22.89**

Fall 2017 (New Curriculum) Presentation 1	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Central Message	27	3	0	0	0	0	**4.92**
Organization	18	11	1	0	0	0	**4.58**
Delivery	4	12	12	2	0	0	**3.73**
Content	13	15	1	1	0	0	**4.40**
Language	28	1	1	0	0	0	**4.90**
					Total (88%)		**22.53**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**

Fall 2016	100%	100%	88%	56%
Spring 2017	100%	100%	100%	40%
Summer 2017	100%	100%	100%	63%
Fall 2017	100%	97%	97%	77%

Semester	**Lowest ranked criteria**
Fall 2016	*Delivery*
Spring 2017	*Delivery*
Summer 2017	*Delivery*
Fall 2017	*Delivery*

c. ACCE SLO #3 - Create a construction project safety plan.

- *Assessed in BSCI 4990 – Thesis. Safety Plan accounts for 5% of Thesis grade. Grading Rubric 4 – Safety – initial rubric measured performance over 8 specific criteria. Revised rubric introduced in Fall 2016 measures across 5 criteria.*

Fall 2014	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	11	0	1	5	1	0	**3.83**
Emergency Contacts	11	6	1	0	0	0	**4.56**
Safety Manager	10	3	3	1	1	0	**4.11**
First Aid	11	3	1	2	1	0	**4.17**
Emergency Plan	10	4	1	2	1	0	**4.11**
Regulations Governing Project	9	5	0	3	1	0	**4.00**
	25	**20**	**15**	**10**	**5**	0	
Analyze Hazards	3	6	4	4	1	0	**16.67**
Create a Safety Plan	5	6	4	2	1	0	**18.33**
Create Plan for Compliance	5	6	2	3	0	0	**16.11**
						Total (72.27%)	**75.89**

Spring 2015	**Grading Scale**	**Average**

	5	4	3	2	1	0	
Specifics of the Project	21	3	3	0	0	0	**4.67**
Emergency Contacts	21	6	0	0	0	0	**4.78**
Safety Manager	17	7	1	2	0	0	**4.44**
First Aid	16	9	0	1	1	0	**4.41**
Emergency Plan	18	3	3	2	1	0	**4.30**
Regulations Governing Project	19	5	1	2	0	0	**4.52**
	25	**20**	**15**	**10**	**5**	**0**	
Analyze Hazards	6	11	8	1	1	0	**18.70**
Create a Safety Plan	3	15	7	2	0	0	**18.51**
Create Plan for Compliance	4	13	7	3	0	0	**18.33**
						Total	**72.28%**

Summer 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	18	2	2	0	0	0	**4.73**
Emergency Contacts	17	4	0	1	0	0	**4.68**
Safety Manager	12	3	5	1	1	0	**4.09**
First Aid	14	3	3	1	1	0	**4.27**
Emergency Plan	15	2	2	2	1	0	**4.27**
Regulations Governing Project	11	2	7	1	0	1	**3.91**
	25	**20**	**15**	**10**	**5**	**0**	
Analyze Hazards	6	8	3	5	0	0	**18.41**
Create a Safety Plan	6	6	6	4	0	0	**18.18**
Create Plan for Compliance	8	4	7	2	1	0	**18.63**
						Total	**76.86%**

Fall 2015* **Changes to Rubric**	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	12	6	6	0	0	1	**4.08**
Safety Manager	9	8	5	1	2	0	**3.84**

First Aid	13	4	3	1	2	2	**3.76**
Emergency Contacts	12	6	4	1	1	1	**3.96**
Accident Plan	11	8	3	1	1	1	**3.96**
Training	8	10	3	1	2	1	**3.72**
	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	7	7	9	1	1	0	**26.04**
Create a Safety Plan for compliance	8	10	5	0	1	1	**26.88**
						Total	**76.24%**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	16	11	2	0	1	0	**4.37**
Safety Manager	19	4	6	0	1	0	**4.33**
First Aid	19	5	4	0	2	0	**4.30**
Emergency Contacts	13	6	6	4	0	1	**3.83**
Accident Plan	17	5	3	1	1	3	**3.90**
Training	15	7	3	1	0	4	**3.80**
	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	13	11	3	1	1	1	**28.23**
Create a Safety Plan for compliance	9	12	7	1	0	1	**27.07**
						Total	**79.83%**

Summer 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	12	4	3	0	1	0	**4.30**
Safety Manager	9	8	1	2	0	0	**4.20**
First Aid	12	4	3	0	1	0	**4.30**
Emergency Contacts	14	4	1	0	1	0	**4.50**
Accident Plan	12	2	5	1	0	3	**4.25**
Training	11	6	0	1	2	0	**4.15**

	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	11	6	2	1	0	0	**30.45**
Create a Safety Plan for compliance	11	7	1	0	1	0	**30.45**
						Total	**86.60%**

Fall 2016 (Revised Rubric)	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	12	8	4	0	0	0	**4.33**
Site Specific Safety Plan	7	15	2	0	0	0	**4..21**
Job Hazard Analysis	9	7	6	2	0	0	**3.96**
Hazardous Materials	9	10	4	1	0	0	**4.13**
Injury/Accident Plan	7	12	5	0	0	3	**4.108**
						Total	**81.58%**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	15	3	2	0	0	0	**4.65**
Site Specific Safety Plan	12	6	1	1	0	0	**4.45**
Job Hazard Analysis	14	4	2	0	0	0	**4.59**
Hazardous Materials	15	4	1	0	0	0	**4.70**
Injury/Accident Plan	13	6	0	1	0	3	**4.55**
						Total	**91.90%**

Summer 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	11	3	0	0	0	0	**4.79**
Site Specific Safety Plan	7	7	0	0	0	0	**4.50**
Job Hazard Analysis	10	3	1	0	0	0	**4.61**
Hazardous Materials	11	1	2	0	0	0	**4.64**
Injury/Accident Plan	9	4	1	0	0	0	**4.54**
						Total	**88.2*%**

Fall 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	26	17	5	1	0	0	**4.39**
Site Specific Safety Plan	21	17	10	1	0	0	**4.18**
Job Hazard Analysis	20	17	9	2	0	0	**4.05**
Hazardous Materials	25	20	3	0	1	0	**4.39**
Injury/Accident Plan	19	18	10	2	0	0	**4.09**
						Total	**83.47%**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Fall 2014	67%	50%	39%	22%
Spring 2015	85%	70%	44%	11%
Summer 2015	67%	52%	33%	22%
Fall 2015	80%	68%	32%	28%
Spring 2016	87%	77%	60%	30%
Summer 2016	80%	80%	70%	50%
Fall 2016	79%	67%	42%	17%
Spring 2017	100%	100%	85%	60%
Summer 2017	100%	100%	86%	50%
Fall 2017	94%	82%	55%	41%

Semester	**Lowest ranked criteria**
Fall 2014	*Create Plan for Compliance*
Spring 2015	*Create Plan for Compliance*
Summer 2015	*Create a Safety Plan*
Fall 2015	*Analyze Hazards*
Spring 2016	*Emergency Contacts*
Summer 2016	*Safety Manager*

Fall 2016	*Job Hazard Analysis*
Spring 2017	*Site Specific Safety Plan*
Summer 2017	*Site Specific Safety Plan*
Fall 2017	*Job Hazard Analysis*

d. ACCE SLO #4 Create construction project cost estimates.

- *Assessed in BSCI 4990 – Thesis. Project Estimate accounts for 15% of Thesis grade. Grading Rubric 1 – Estimate - measures performance over 5 specific criteria.*

Fall 2014	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	8	5	4	1	0	0	**4.11**
Calculate Building Quantities	6	7	3	1	1	0	**3.89**
Choose Appropriate Technology for Creating Estimate	7	6	4	0	1	0	**4.00**
BIM Model	13	3	2	0	0	0	**4.61**
Create an Estimate	6	8	4	0	0	0	**4.11**
					Total (82.89%)		**20.72**

Spring 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	15	9	3	2	2	0	**4.06**
Calculate Building Quantities	9	17	2	0	3	0	**3.94**
Choose Appropriate Technology for Creating Estimate	12	12	4	1	1	1	**3.97**
BIM Model	19	5	4	0	2	1	**4.16**
Create an Estimate	4	20	4	1	2	0	**3.74**
					Total (79.48%)		**19.87**

Summer 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	

Classify Materials and Methods by Trades	10	8	4	0	0	0	**4.27**
Calculate Building Quantities	7	11	4	0	0	0	**4.14**
Choose Appropriate Technology for Creating Estimate	10	11	1	0	0	0	**4.41**
BIM Model	10	10	1	1	0	0	**4.32**
Create an Estimate	5	16	1	0	0	0	**4.18**
					Total (85.27%)		**21.32**

Fall 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	13	8	3	1	0	0	**4.32**
Calculate Building Quantities	6	13	4	1	0	0	**3.88**
Choose Appropriate Technology for Creating Estimate	10	12	2	1	0	0	**4.24**
BIM Model	15	8	1	0	1	0	**4.44**
Create an Estimate	4	14	6	0	1	0	**3.80**
					Total (82.72%)		**20.7**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	14	7	5	2	1	0	**4.07**
Calculate Building Quantities	11	9	5	3	1	0	**3.90**
Choose Appropriate Technology for Creating Estimate	23	4	2	0	0	0	**4.72**
BIM Model	15	13	1	0	0	0	**4.48**
Create an Estimate	11	7	4	3	4	0	**3.62**
					Total (83.17%)		**20.8**

Summer 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	

Classify Materials and Methods by Trades	12	6	1	1	0	0	**4.45**
Calculate Building Quantities	8	6	6	0	0	0	**4.10**
Choose Appropriate Technology for Creating Estimate	12	6	2	0	0	0	**4.50**
BIM Model	11	6	3	0	0	0	**4.40**
Create an Estimate	6	8	4	0	1	0	**3.93**
					Total (85.50%)		**21.4**

Fall 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	15	16	1	2	2	0	**4.10**
Calculate Building Quantities	9	14	7	4	2	0	**3.63**
Choose Appropriate Technology for Creating Estimate	15	15	6	0	0	0	**4.24**
BIM Model	18	12	3	3	0	0	**4.25**
Create an Estimate	3	20	7	1	4	0	**3.44**
					Total (78.63%)		**19.7**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	11	11	1	0	0	0	**4.43**
Calculate Building Quantities	12	5	1	3	2	0	**3.96**
Choose Appropriate Technology for Creating Estimate	11	9	1	0	2	0	**4.17**
BIM Model	14	9	0	0	0	0	**4.61**
Create an Estimate	5	11	4	2	1	0	**3.73**

Total (83.58%)		**20.9**

Summer 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	9	3	3	1	0	0	**4.25**
Calculate Building Quantities	6	7	1	1	1	0	**4.00**
Choose Appropriate Technology for Creating Estimate	10	4	2	0	0	0	**4.50**
BIM Model	12	3	0	1	0	0	**4.63**
Create an Estimate	4	5	2	4	1	0	**3.44**
Total (83.25%)							**20.8**

Fall 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Classify Materials and Methods by Trades	19	20	5	2	3	0	**3.99**
Calculate Building Quantities	11	21	10	5	2	0	**3.65**
Choose Appropriate Technology for Creating Estimate	29	11	7	1	1	0	**4.34**
BIM Model	32	15	2	0	0	0	**4.61**
Create an Estimate	3	23	15	5	3	0	**3.36**
Total (79.8%)							**19.9**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Fall 2014	94%	83%	56%	39%
Spring 2015	81%	77%	58%	23%

Summer 2015	71%	68%	48%	23%
Fall 2015	88%	84%	64%	28%
Spring 2016	90%	83%	62%	45%
Summer 2016	85%	80%	60%	35%
Fall 2016	69%	61%	36%	6%
Spring 2017	91%	91%	61%	35%
Summer 2017	88%	88%	69%	38%
Fall 2017	88%	82%	59%	29%

Semester	**Lowest ranked criteria**
Fall 2014	*Calculate Building Quantities*
Spring 2015	*Create an Estimate*
Summer 2015	*Calculate Building Quantities*
Fall 2015	*Create an Estimate*
Spring 2016	*Create an Estimate*
Summer 2016	*Create an Estimate*
Fall 2016	*Create an Estimate*
Spring 2017	*Create an Estimate*
Summer 2017	*Create an Estimate*
Fall 2017	*Create an Estimate*

e. ACCE SLO # 5 Create construction project schedules.

- *Assessed in BSCI 4990 – Thesis. Scheduling Assessment accounts for 10% of Thesis grade. Grading Rubric 5 – Scheduling - measures performance over 5 specific criteria*

Fall 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	11	11	2	0	0	0	**4.38**
Calculate and apply durations	10	11	2	1	0	0	**4.25**
Assign relationships and constraints	8	11	4	1	0	0	**4.08**

Leverage the software platform	12	8	3	1	0	0	**4.29**
Create a project schedule	7	13	3	1	0	0	**4.08**
					Total (84.33%)		**21.08**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	12	11	4	3	0	0	**4.07**
Calculate and apply durations	18	5	4	3	0	0	**4.27**
Assign relationships and constraints	7	14	8	1	0	0	**3.90**
Leverage the software platform	14	13	2	1	0	0	**4.33**
Create a project schedule	7	16	2	5	0	0	**3.83**
					Total (81.60%)		**20.40**

Summer 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	12	6	1	1	0	0	**4.45**
Calculate and apply durations	10	5	4	1	0	0	**4.20**
Assign relationships and constraints	5	8	5	2	0	0	**3.80**
Leverage the software platform	9	7	4	0	0	0	**4.25**
Create a project schedule	9	3	7	1	0	0	**4.00**
					Total (82.80%)		**20.70**

Fall 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	20	11	3	1	0	0	**4.41**
Calculate and apply durations	15	11	4	4	1	0	**3.97**
Assign relationships and constraints	13	10	9	2	1	0	**3.96**
Leverage the software platform	16	13	4	1	1	0	**4.21**
Create a project schedule	12	14	4	4	1	0	**3.91**

Total (81.83%)		**20.46**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	11	6	4	2	0	0	**4.13**
Calculate and apply durations	10	7	4	2	0	0	**4.09**
Assign relationships and constraints	7	8	6	2	0	0	**3.87**
Leverage the software platform	13	8	2	0	0	0	**4.48**
Create a project schedule	7	9	4	3	0	0	**3.87**
					Total (81.74%)		**20.43**

Summer 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	10	4	2	0	0	0	**4.50**
Calculate and apply durations	5	7	2	2	0	0	**3.94**
Assign relationships and constraints	4	9	1	2	0	0	**3.94**
Leverage the software platform	11	4	0	1	0	0	**4.56**
Create a project schedule	7	3	3	2	1	0	**3.81**
					Total (83.00%)		**20.75**

Fall 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Develop work breakdown structure	21	21	4	3	0	0	**4.21**
Calculate and apply durations	14	24	5	4	2	0	**3.89**
Assign relationships and constraints	12	19	10	5	3	0	**3.64**
Leverage the software platform	20	24	2	1	2	0	**4.20**
Create a project schedule	11	23	4	11	0	0	**3.68**
					Total (78.53%)		**19.63**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Fall 2015	96%	88%	67%	38%
Spring 2016	83%	73%	67%	43%
Summer 2016	75%	65%	50%	50%
Fall 2016	71%	66%	46%	31%
Spring 2017	87%	74%	52%	35%
Summer 2017	88%	81%	56%	50%
Fall 2017	84%	80%	49%	14%

Semester	**Lowest ranked criteria**
Fall 2015	*Assign relationships and constraints/create a project schedule*
Spring 2016	*Create a project schedule*
Summer 2016	*Assign relationships and constraints*
Fall 2016	*Create a project schedule*
Spring 2017	*Assign relationships and constraints* *Create a project schedule*
Summer 2017	*Create a project schedule*
Fall 2017	*Assign relationships and constraints*

f. ACCE SLO #6 Analyze professional decisions based on ethical principles.

- *Assessed in BSCI 3200 – Construction Communication – Students write a business policy on gifts and entertainment accounts for 10% of overall grade.*

Fall 2017	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Write a business policy on gifts and entertainment	0	0	1	5	25	95%

g. ACCE SLO #11 Apply basic surveying techniques for construction layout and control.

- *Assessed in BSCI 3300 – Field Surveying. Final Examination accounts for 10% of final grade. Field Book accounts for 10% of final grade.*

Summer 2016	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Final Examination	0	1	8	31	57	90.30
Field Book	0	0	3	3	91	97.46

Summer 2017	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Final Examination	0	2	24	46	54	87.05
Field Book	0	0	0	4	122	98.39

h. ACCE SLO #18 Understand the basic principles of sustainable construction.

- *Assessed in BSCI 4990 – Thesis. LEED Assessment accounts for 5% of Thesis grade. Grading Rubric 2 – Sustainability - measures performance over 5 specific criteria.*

Fall 2014	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the appropriate LEED rating system for your project	12	2	2	1	0	0	**4.47**
Identify a material that has recycled content and provide documentation showing source of information	13	2	2	0	0	0	**4.65**
Calculate the % of the recycled material based on value.	8	1	3	5	0	0	**3.71**
Provide Map of Locally Resourced Material	13	1	3	0	0	0	**4.59**

Provide Table of Locally Resourced Material	10	3	3	0	1	0	**4.24**
Calculate the $ amount that would be required to achieve 2 LEED points	9	1	6	0	0	1	**3.94**
Identify recycling service provider and services provided	9	1	4	3	0	0	**3.94**
					Total (84.37%)		**29.53**

Spring 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the appropriate LEED rating system for your project	20	2	1	0	1	1	**4.48**
Identify a material that has recycled content and provide documentation showing source of information	21	1	3	0	0	0	**4.72**
Calculate the % of the recycled material based on value.	20	1	4	0	0	0	**4.64**
Provide Map of Locally Resourced Material	18	3	1	0	2	1	**4.28**
Provide Table of Locally Resourced Material	20	3	2	0	0	0	**4.72**
Calculate the $ amount that would be required to achieve 2 LEED points	17	6	1	0	0	1	**4.48**
Identify recycling service provider and services provided	17	5	0	0	1	2	**4.24**
					Total (90.17%)		**31.56**

Summer 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the appropriate LEED rating system for your project	16	1	3	1	0	1	**4.32**
Identify a material that has recycled content and provide documentation showing source of information	11	2	4	0	5	0	**3.64**
Calculate the % of the recycled material based on value.	9	9	1	1	1	1	**3.95**

Provide Map of Locally Resourced Material	5	4	4	0	0	9	**2.41**
Provide Table of Locally Resourced Material	9	8	3	1	0	1	**4.00**
Calculate the $ amount that would be required to achieve 2 LEED points	13	3	1	2	0	3	**3.82**
Identify recycling service provider and services provided	8	7	3	2	0	2	**3.68**
					Total (70.13%)		**25.82**

Fall 2015*	**Grading Scale**						**Average**
Changes to rubric	**5**	**4**	**3**	**2**	**1**	**0**	
Environmental impacts of construction on site	13	12	0	0	0	0	**4.52**
Fundamental commissioning and verification	9	11	5	0	0	0	**4.16**
Environmentally preferable products	11	6	6	2	0	0	**4.04**
Reduce construction waste	11	11	2	1	0	0	**4.28**
IAQ management plan	9	6	8	2	0	0	**3.88**
					Total (83.52%)		**20.90**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Environmental impacts of construction on site	18	10	1	0	1	0	**4.47**
Fundamental commissioning and verification	16	6	7	0	1	0	**4.20**
Environmentally preferable products	19	3	5	1	2	0	**4.20**
Reduce construction waste	18	10	1	0	1	0	**4.47**
IAQ management plan	16	4	8	0	2	0	**4.07**
					Total (85.60%)		**21.40**

Summer 2016	**Grading Scale**	**Average**

	5	4	3	2	1	0	
Environmental impacts of construction on site	17	1	2	0	1	0	**4.75**
Fundamental commissioning and verification	10	8	2	0	1	0	**4.40**
Environmentally preferable products	13	4	2	0	0	1	**4.35**
Reduce construction waste	11	4	3	0	1	1	**4.05**
IAQ management plan	12	4	2	2	0	0	**4.30**
					Total (87.40%)		**21.90**

Fall 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Environmental impacts of construction on site	23	7	4	0	0	0	**4.57**
Fundamental commissioning and verification	14	10	6	2	0	2	**3.88**
Environmentally preferable products	18	9	5	0	0	2	**4.16**
Reduce construction waste	18	9	5	1	1	0	**4.20**
IAQ management plan	15	11	4	3	0	1	**4.03**
					Total (83.32%)		**20.8**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Environmental impacts of construction on site	14	9	0	0	0	0	**4.59**
Fundamental commissioning and verification	9	11	3	0	0	0	**4.25**
Environmentally preferable products	18	3	0	1	0	1	**4.52**
Reduce construction waste	16	6	1	0	0	0	**4.58**
IAQ management plan	14	3	4	1	0	1	**4.17**
					Total (88.80%)		**22.1**

Summer 2017	Grading Scale						Average
	5	4	3	2	1	0	
Environmental impacts of construction on site	9	5	2	0	0	0	**4.44**
Fundamental commissioning and verification	9	5	0	2	0	0	**4.31**
Environmentally preferable products	12	4	0	0	0	0	**4.75**
Reduce construction waste	11	2	3	0	0	0	**4.50**
IAQ management plan	10	4	2	0	0	0	**4.50**
					Total (90.00%)		**22.5**

Fall 2017	Grading Scale						Average
	5	4	3	2	1	0	
Environmental impacts of construction on site	29	16	1	2	0	1	**4.39**
Fundamental commissioning and verification	23	19	3	1	2	1	**4.14**
Environmentally preferable products	18	17	3	7	1	3	**3.70**
Reduce construction waste	22	19	4	2	1	1	**4.10**
IAQ management plan	22	9	15	2	0	1	**3.95**
					Total (81.12%)		**20.30**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Fall 2014	94%	76%	59%	47%
Spring 2015	92%	88%	76%	64%
Summer 2015	64%	52%	36%	24%
Fall 2015	88%	88%	56%	28%
Spring 2016	97%	83%	63%	57%
Summer 2016	90%	85%	65%	55%
Fall 2016	71%	65%	38%	24%
Spring 2017	91%	83%	74%	61%

Summer 2017	100%	100%	81%	56%
Fall 2017	90%	86%	59%	33%

Semester	**Lowest ranked criteria**
Fall 2014	*Calculate the % of the recycled material based on value.*
Spring 2015	*Identify recycling service provider and services provided*
Summer 2015	*Provide Map of Locally Resourced Material*
Fall 2015	*IAQ management plan*
Spring 2016	*IAQ management plan*
Summer 2016	*Reduce construction waste*
Fall 2016	*Fundamental commissioning and verification*
Spring 2017	*IAQ management plan*
Summer 2017	*Fundamental commissioning and verification*
Fall 2017	*Environmentally preferable products*

i. ACCE SLO # 19 Understand the basic principles of structural behavior.

- *Assessed in BSCI 4990 – Thesis. Structural Assessment accounts for 5% of Thesis grade. Grading Rubric 3 – Structural - measures performance over 7 specific criteria.*

Fall 2014	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	8	9	1	0	0	**0**	**4.39**
Identify common methods of stabilizing structural frames	8	6	4	0	0	**0**	**4.22**
Classify Loads on Buildings	9	6	3	0	0	**0**	**4.33**
Trace the path of vertical and lateral loads through structural components of a post and beam building	10	6	2	0	0	**0**	**4.44**
Design and Construct strong, stiff, & stable temporary structures and formwork	10	4	1	0	3	**0**	**4.00**

Calculate internal member forces in structural elements of buildings	10	1	4	1	2	**0**	**3.89**
Determine internal stresses on structural bending elements	10	1	4	1	2	**0**	**3.89**
					Total (83.33%)		**29.17**

Spring 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	13	12	2	1	0	1	**4.17**
Identify common methods of stabilizing structural frames	14	10	3	1	0	1	**4.17**
Classify Loads on Buildings	18	7	2	0	2	0	**4.34**
Trace the path of vertical and lateral loads through structural components of a post and beam building	16	10	1	0	2	0	**4.31**
Design and Construct strong, stiff, & stable temporary structures and formwork	18	8	4	3	0	0	**4.14**
Calculate internal member forces in structural elements of buildings	15	3	4	2	4	1	**3.69**
Determine internal stresses on structural bending elements	16	4	4	1	4	0	**3.93**
					Total (82.17%)		**28.76**

Summer 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	9	9	3	1	0	0	**4.18**
Identify common methods of stabilizing structural frames	8	10	3	0	0	1	**4.05**
Classify Loads on Buildings	8	13	0	0	1	0	**4.23**
Trace the path of vertical and lateral loads through structural components of a post and beam building	6	12	3	0	0	1	**3.95**
Design and Construct strong, stiff, & stable temporary structures and formwork	8	4	3	4	2	1	**3.41**

Calculate internal member forces in structural elements of buildings	7	2	7	1	4	1	**3.18**
Determine internal stresses on structural bending elements	4	5	4	4	4	1	**2.91**
					Total (74.03%)		**25.91**

Fall 2015	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	13	11	1	0	0	0	**4.48**
Identify common methods of stabilizing structural frames	9	12	2	2	0	0	**4.12**
Classify Loads on Buildings	13	8	3	0	1	0	**4.28**
Trace the path of vertical and lateral loads through structural components of a post and beam building	16	6	3	0	1	1	**4.52**
Design and Construct strong, stiff, & stable temporary structures and formwork	9	9	5	0	1	1	**3.88**
Calculate internal member forces in structural elements of buildings	11	8	4	1	0	1	**4.04**
Determine internal stresses on structural bending elements	13	3	4	1	0	4	**3.64**
					Total (74.03%)		**25.91**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	20	8	1	1	0	0	**4.57**
Identify common methods of stabilizing structural frames	17	8	4	1	0	0	**4.37**
Classify Loads on Buildings	17	11	1	0	1	0	**4.43**
Trace the path of vertical and lateral loads through structural components of a post and beam building	19	7	2	0	2	0	**4.37**

Design and Construct strong, stiff, & stable temporary structures and formwork	21	2	3	3	1	0	**4.30**
Calculate internal member forces in structural elements of buildings	19	6	2	1	0	0	**4.30**
Determine internal stresses on structural bending elements	16	8	3	1	2	4	**4.17**
					Total (87.14%)		**30.50**

Summer 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	17	13	3	1	1	0	**4.24**
Identify common methods of stabilizing structural frames	15	10	5	2	3	0	**3.89**
Classify Loads on Buildings	21	9	2	0	2	1	**4.26**
Trace the path of vertical and lateral loads through structural components of a post and beam building	19	11	3	1	1	0	**4.31**
Design and Construct strong, stiff, & stable temporary structures and formwork	18	7	5	2	2	1	**3.94**
Calculate internal member forces in structural elements of buildings	20	8	2	1	3	1	**4.31**
Determine internal stresses on structural bending elements	20	6	4	1	3	1	**3.94**
					Total (82.55%)		**28.89**

Fall 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	15	3	1	1	0	0	**4.60**
Identify common methods of stabilizing structural frames	8	8	2	0	2	0	**4.00**
Classify Loads on Buildings	17	11	1	0	1	0	**4.43**
Trace the path of vertical and lateral loads through structural	12	5	2	0	1	0	**4.35**

components of a post and beam building							
Design and Construct strong, stiff, & stable temporary structures and formwork	8	6	2	3	1	0	**3.85**
Calculate internal member forces in structural elements of buildings	11	2	4	0	3	0	**3.90**
Determine internal stresses on structural bending elements	12	1	5	0	2	0	**4.05**
					Total (83.57%)		**29.25**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	18	3	0	1	1	0	**4.57**
Identify common methods of stabilizing structural frames	18	3	1	0	1	0	**4.61**
Classify Loads on Buildings	16	4	2	0	1	0	**4.48**
Trace the path of vertical and lateral loads through structural components of a post and beam building	17	2	3	0	1	0	**4.48**
Design and Construct strong, stiff, & stable temporary structures and formwork	18	3	1	0	1	0	**4.61**
Calculate internal member forces in structural elements of buildings	18	2	1	1	1	0	**4.52**
Determine internal stresses on structural bending elements	19	1	1	1	1	0	**4.57**
					Total (90.93%)		**31.83**

Summer 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	10	5	1	0	0	0	**4.56**
Identify common methods of stabilizing structural frames	8	4	4	0	0	0	**4.25**
Classify Loads on Buildings	9	4	2	1	0	0	**4.31**

Trace the path of vertical and lateral loads through structural components of a post and beam building	11	2	3	0	0	0	**4.49**
Design and Construct strong, stiff, & stable temporary structures and formwork	12	1	3	0	0	0	**4.56**
Calculate internal member forces in structural elements of buildings	11	2	2	0	1	0	**4.38**
Determine internal stresses on structural bending elements	12	1	2	0	1	0	**4.44**
					Total (88.54%)		**30.99**

Fall 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Identify the structural components of a building	27	17	4	1	0	0	**4.42**
Identify common methods of stabilizing structural frames	20	14	12	3	0	0	**4.04**
Classify Loads on Buildings	26	18	3	2	0	0	**4.39**
Trace the path of vertical and lateral loads through structural components of a post and beam building	26	13	7	2	1	0	**4.24**
Design and Construct strong, stiff, & stable temporary structures and formwork	24	15	4	2	2	2	**4.04**
Calculate internal member forces in structural elements of buildings	28	9	5	4	0	3	**4.06**
Determine internal stresses on structural bending elements	27	11	4	4	1	2	**4.08**
					Total (83.64%)		**29.28**

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Fall 2014	89%	83%	56%	39%
Spring 2015	79%	72%	59%	38%
Summer 2015	55%	52%	31%	17%

Fall 2015	84%	80%	64%	48%
Spring 2016	93%	90%	77%	53%
Summer 2016	80%	65%	50%	45%
Fall 2016	69%	60%	43%	31%
Spring 2017	91%	91%	87%	70%
Summer 2017	100%	94%	63%	50%
Fall 2017	88%	88%	71%	45%

Semester	**Lowest ranked criteria**
Fall 2014	*Calculate internal member forces in structural elements of buildings.* *Determine internal stresses on structural bending elements.*
Spring 2015	*Calculate internal member forces in structural elements of buildings.*
Summer 2015	*Determine internal stresses on structural bending elements.*
Fall 2015	*Determine internal stresses on structural bending elements.*
Spring 2016	*Determine internal stresses on structural bending elements*
Summer 2016	*Design and Construct strong, stiff, & stable temporary structures and formwork*
Fall 2016	*Design and Construct strong, stiff, & stable temporary structures and formwork*
Spring 2017	*Classify Loads on Buildings* *Trace the path of vertical and lateral loads through structural components of a post and beam building*
Summer 2017	*Identify common methods of stabilizing structural frames*
Fall 2017	*Design and Construct strong, stiff, & stable temporary structures and formwork*

j. **ACCE SLO #20 Understand the basic principles of mechanical, electrical and piping systems.**

a. Assessed in examinations in BSCI 4700 Mechanical Systems in Buildings & BSCI 4750 Electrical Systems in Buildings:

Fall 2016	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Final Examination BSCI 4700 (Mechanical portion)	0	1	14	30	14	85%
Mid Term Examination BSCI 4700 (Plumbing portion)	1	1	14	32	12	84%
3 Examinations in BSCI 4750 (Electrical)	3	1	9	40	67	88%

Spring 2017	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Final Examination BSCI 4700 (Mechanical portion)	0	3	11	23	12	84%
Mid Term Examination BSCI 4700 (Plumbing portion)	0	0	11	29	9	84%
3 Examinations in BSCI 4750 (Electrical)	0	0	4	36	18	87 %

Fall 2017	**No. of students**					**Average**
Assessment	**<60**	**60-69**	**70-79**	**80-89**	**90+**	
Final Examination BSCI 4700 (Mechanical portion)	3	6	15	24	18	82.79%
Mid Term Examination BSCI 4700 (Plumbing portion)	0	1	6	23	36	88.97%

3 Examinations in BSCI 4750 (Electrical)	#11	0	5	25	20	88.00%

Percentage of students scoring above	**60%**	**70%**	**80%**	**90%**
Mechanical Fall 2016	100%	98%	75%	23%
Electrical Fall 2016	100%	98%	75%	20%
Plumbing Fall 2016	99%	97%	89%	56%
Mechanical Spring 2017	100%	94%	71%	24%
Electrical Spring 2017	100%	100%	93%	31%
Plumbing Spring 2017	100%	100%	78%	18%
Mechanical Fall 2017	95%	86%	63%	27%
Electrical Fall 2017	100%	100%	90%	40%

Plumbing Fall 2017	100%	98%	89%	55%

8a. Indirect Measure

Indirectly measure the students' perception of their ability to meet the 20 ACCE Student Learning Outcomes using an exit survey that assesses how strongly they agree they have met the 20 outcomes.

Performance Criteria for student learning outcomes were established by the BSCI Faculty at the BSCI Quality Improvement Meeting held on May 9, 2017. For indirect assessment of Student Learning Outcomes: 80% of graduating students should agree they have met the learning outcomes. Any student learning outcome that falls below this threshold for 4 consecutive semesters will be evaluated by a faculty review. From Fall 2017 any assessment measure not meeting this criteria will be highlighted in **RED.**

Our accreditation agency, The American Council for Construction Education, has established learning outcomes that set out what you should be able to do upon graduation. On a scale of 1 to 5, rate how strongly you agree or disagree that you have achieved the following outcomes:

a. Individual responses and average response

i. Create written communications appropriate to the construction discipline

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	4	4	4.50
Spring 2015 (28 Reporting)	0	0	0	9	19	4.68
Summer 2015 (21 Reporting)	0	0	0	4	17	4.81
Fall 2015 (20 Reporting)	0	0	4	9	7	4.15
Spring 2016 (21 Reporting)	0	0	1	7	13	4.57
Summer 2016 (21 Reporting)	0	0	2	11	11	4.38
Fall 2016 (27 Reporting)	0	0	0	12	15	4.56
Spring 2017 (14 Reporting)	0	0	0	6	8	4.57
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	0	3	16	23	4.48

ii. Create oral presentations appropriate to the construction discipline

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	3	4	4.38
Spring 2015 (28 Reporting)	0	0	1	8	19	4.64
Summer 2015 (21 Reporting)	0	0	1	11	9	4.38
Fall 2015 (20 Reporting)	0	0	4	10	6	4.10
Spring 2016 (21 Reporting)	0	0	1	8	12	4.52
Summer 2016 (24 Reporting)	0	1	1	13	9	4.25
Fall 2016 (27 Reporting)	0	0	1	10	16	4.56
Spring 2017 (14 Reporting)	0	0	0	5	9	4.64
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	0	1	19	22	4.50

iii. Create a construction project safety plan.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	5	3	4.38
Spring 2015 (28 Reporting)	0	0	1	11	16	4.54
Summer 2015 (21 Reporting)	0	0	2	9	10	4.38
Fall 2015 (20 Reporting)	0	1	3	8	8	4.15
Spring 2016 (21 Reporting)	0	0	0	7	14	4.67
Summer 2016 (24 Reporting)	0	1	3	10	10	4.21
Fall 2016 (27 Reporting)	0	0	1	13	13	4.44
Spring 2017 (14 Reporting)	0	0	0	3	11	4.79
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	2	20	19	4.36

iv. Create construction project cost estimates.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	3	5	4.63
Spring 2015 (28 Reporting)	0	0	0	3	25	4.89
Summer 2015 (21 Reporting)	0	0	1	5	15	4.67

Fall 2015 (20 Reporting)	1	0	2	6	11	4..30
Spring 2016 (21 Reporting)	0	0	1	4	16	4.71
Summer 2016 (24 Reporting)	0	0	1	9	14	4.54
Fall 2016 (27 Reporting)	0	0	1	8	18	4.63
Spring 2017 (14 Reporting)	0	0	0	3	11	4.79
Summer 2017 (10 Reporting)	0	0	0	1	9	4.90
Fall 2017 (42 Reporting)	0	0	2	16	24	4.52

v. Create construction project schedules

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	2	6	4.75
Spring 2015 (28 Reporting)	0	0	0	5	23	4.82
Summer 2015 (21 Reporting)	0	0	0	11	10	4.48
Fall 2015 (20 Reporting)	0	1	2	6	11	4.35
Spring 2016 (21 Reporting)	0	0	1	7	13	4.57
Summer 2016 (24 Reporting)	0	0	2	9	13	4.56
Fall 2016 (27 Reporting)	0	0	0	8	19	4.70
Spring 2017 (14 Reporting)	0	0	0	4	10	4.71
Summer 2017 (10 Reporting)	0	0	0	1	9	4.90
Fall 2017 (42 Reporting)	0	0	3	14	25	4.52

vi. Analyze professional decisions based on ethical principles

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	2	5	4.50
Spring 2015 (28 Reporting)	0	0	2	11	15	4.46
Summer 2015 (21 Reporting)	0	0	2	9	10	4.38
Fall 2015 (20 Reporting)	0	0	2	11	7	4.25
Spring 2016 (21 Reporting)	0	0	4	4	14	4.48
Summer 2016 (24 Reporting)	0	0	3	9	12	4.38
Fall 2016 (27 Reporting)	0	1	1	7	18	4.56

Spring 2017 (14 Reporting)	0	0	0	5	9	4.64
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	0	1	24	17	4.38

vii. Analyze construction documents for planning and management of construction processes

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	2	5	4.50
Spring 2015 (28 Reporting)	0	0	1	7	20	4.68
Summer 2015 (21 Reporting)	0	0	1	8	12	4.52
Fall 2015 (20 Reporting)	0	0	3	8	9	4..30
Spring 2016 (21 Reporting)	0	1	0	5	15	4.62
Summer 2016 (24 Reporting)	0	0	4	8	12	4.33
Fall 2016 (27 Reporting)	0	0	0	10	17	4.63
Spring 2017 (14 Reporting)	0	0	0	7	7	4.50
Summer 2017 (10 Reporting)	0	0	0	2	8	4.80
Fall 2017 (42 Reporting)	0	1	1	`7	23	4.48

viii. Analyze methods, materials, and equipment used to construct projects.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	4	4	4.50
Spring 2015 (28 Reporting)	0	0	1	11	16	4.54
Summer 2015 (21 Reporting)	0	0	1	9	11	4.48
Fall 2015 (20 Reporting)	0	0	4	8	8	4.20
Spring 2016 (21 Reporting)	0	0	2	6	13	4.52
Summer 2016 (24 Reporting)	0	2	2	10	10	4.17
Fall 2016 (27 Reporting)	0	0	1	12	14	4.48
Spring 2017 (14 Reporting)	0	0	1	5	8	4.50
Summer 2017 (10 Reporting)	0	0	0	2	8	4.80
Fall 2017 (42 Reporting)	0	1	2	17	22	4.43

ix. Apply construction management skills as a member of a multidisciplinary team.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	4	4	4.50
Spring 2015 (28 Reporting)	0	1	1	6	20	4.61
Summer 2015 (21 Reporting)	0	0	1	6	14	4.62
Fall 2015 (20 Reporting)	0	0	4	8	8	4.20
Spring 2016 (21 Reporting)	0	0	0	6	15	4.71
Summer 2016 (24 Reporting)	0	2	3	8	11	4.17
Fall 2016 (27 Reporting)	0	0	1	13	13	4.44
Spring 2017 (14 Reporting)	0	0	0	6	8	4.57
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	1	0	1	17	23	4.45

x. Apply electronic-based technology to manage the construction process.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	3	4	4.38
Spring 2015 (28 Reporting)	0	0	0	11	17	4.61
Summer 2015 (21 Reporting)	0	0	2	8	11	4.43
Fall 2015 (20 Reporting)	0	0	3	10	7	4.20
Spring 2016 (21 Reporting)	0	0	0	6	15	4.71
Summer 2016 (24 Reporting)	0	2	0	10	12	4.33
Fall 2016 (27 Reporting)	0	0	1	13	13	4.44
Spring 2017 (14 Reporting)	1	0	0	3	10	4.50
Summer 2017 (10 Reporting)	0	0	1	2	7	4.60
Fall 2017 (42 Reporting)	0	0	1	19	22	4.50

xi. Apply basic surveying techniques for construction layout and control.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	5	3	4.38

Spring 2015 (28 Reporting)	0	0	1	10	17	4.57
Summer 2015 (21 Reporting)	0	2	2	7	10	4.19
Fall 2015 (20 Reporting)	1	0	4	8	7	4.00
Spring 2016 (21 Reporting)	0	0	2	5	14	4.57
Summer 2016 (24 Reporting)	0	1	0	15	8	4.25
Fall 2016 (27 Reporting)	0	1	3	11	12	4.26
Spring 2017 (14 Reporting)	0	0	0	4	10	4.71
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	2	24	15	4.26

xii. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	3	5	4.63
Spring 2015 (28 Reporting)	0	0	0	13	15	4.54
Summer 2015 (21 Reporting)	0	0	0	12	9	4.43
Fall 2015 (20 Reporting)	0	0	5	4	11	4.30
Spring 2016 (21 Reporting)	0	0	2	5	14	4.57
Summer 2016 (24 Reporting)	0	1	1	10	12	4.38
Fall 2016 (27 Reporting)	0	0	2	10	15	4.48
Spring 2017 (14 Reporting)	0	0	0	6	8	4.57
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	1	0	1	22	18	4.33

xiii. Understand construction risk management.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	5	3	4.38
Spring 2015 (28 Reporting)	0	0	1	15	12	4.39
Summer 2015 (21 Reporting)	0	0	2	10	9	4.33
Fall 2015 (20 Reporting)	0	0	2	9	9	4.35

Spring 2016 (21 Reporting)	0	0	3	6	12	4.43
Summer 2016 (24 Reporting)	0	0	2	11	11	4.38
Fall 2016 (27 Reporting)	0	0	2	17	8	4.22
Spring 2017 (14 Reporting)	0	0	0	5	9	4.64
Summer 2017 (10 Reporting)	0	0	0	5	5	4.50
Fall 2017 (42 Reporting)	0	0	3	18	21	4.43

xiv. Understand construction accounting and cost control.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	4	3	4.25
Spring 2015 (28 Reporting)	0	0	3	12	13	4.36
Summer 2015 (21 Reporting)	0	0	2	11	8	4.29
Fall 2015 (20 Reporting)	0	1	3	9	7	4.10
Spring 2016 (21 Reporting)	0	2	1	5	13	4.38
Summer 2016 (24 Reporting)	0	2	4	11	7	3.96
Fall 2016 (27 Reporting)	0	2	3	16	6	3.96
Spring 2017 (14 Reporting)	0	0	1	8	5	4.29
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	5	22	14	4.17

xv. Understand construction quality assurance and control.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	4	3	4.25
Spring 2015 (28 Reporting)	0	0	2	10	16	4.50
Summer 2015 (21 Reporting)	0	0	2	12	7	4.24
Fall 2015 (20 Reporting)	0	0	5	9	6	4.05
Spring 2016 (21 Reporting)	0	1	3	5	12	4.33
Summer 2016 (24 Reporting)	0	3	5	7	9	3.92
Fall 2016 (27 Reporting)	0	1	4	10	12	4.22
Spring 2017 (14 Reporting)	0	0	1	6	7	4.43

Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	2	22	17	4.31

xvi. Understand construction project control processes.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	3	5	4.63
Spring 2015 (28 Reporting)	0	0	2	10	16	4.50
Summer 2015 (21 Reporting)	0	0	2	8	11	4.43
Fall 2015 (20 Reporting)	0	0	4	9	7	4.15
Spring 2016 (21 Reporting)	0	0	2	6	13	4.52
Summer 2016 (24 Reporting)	0	2	3	10	9	4.08
Fall 2016 (27 Reporting)	0	0	2	10	15	4.48
Spring 2017 (14 Reporting)	0	0	1	6	7	4.43
Summer 2017 (10 Reporting)	0	0	0	2	8	4.80
Fall 2017 (42 Reporting)	0	0	2	22	17	4.31

xvii. Understand the legal implications of contract, common, and regulatory law to manage a construction project.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	4	4	4.50
Spring 2015 (28 Reporting)	0	0	2	11	15	4.46
Summer 2015 (21 Reporting)	0	0	2	12	7	4.24
Fall 2015 (20 Reporting)	0	0	6	8	6	4.00
Spring 2016 (21 Reporting)	0	0	1	7	13	4.57
Summer 2016 (24 Reporting)	0	1	5	8	10	4.13
Fall 2016 (27 Reporting)	0	1	1	12	13	4.37
Spring 2017 (14 Reporting)	0	0	1	8	5	4.29
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	4	20	17	4.45

xviii. Understand the basic principles of sustainable construction.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	2	2	4	4.25
Spring 2015 (28 Reporting)	0	1	2	13	12	4.29
Summer 2015 (21 Reporting)	0	0	4	12	4	4.00
Fall 2015 (20 Reporting)	1	1	5	8	5	3.75
Spring 2016 (21 Reporting)	1	0	2	8	10	4.24
Summer 2016 (24 Reporting)	1	0	8	6	9	3.92
Fall 2016 (27 Reporting)	0	0	3	16	8	4.19
Spring 2017 (14 Reporting)	0	0	0	10	4	4.29
Summer 2017 (10 Reporting)	0	0	1	3	6	4.50
Fall 2017 (42 Reporting)	0	4	10	16	12	3.86

xix. Understand the basic principles of structural behavior.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	0	5	3	4.38
Spring 2015 (28 Reporting)	0	0	1	8	19	4.64
Summer 2015 (21 Reporting)	0	0	2	13	6	4.19
Fall 2015 (20 Reporting)	0	0	4	10	6	4.10
Spring 2016 (21 Reporting)	0	0	1	7	13	4.57
Summer 2016 (24 Reporting)	0	1	2	11	10	4.25
Fall 2016 (27 Reporting)	0	1	2	13	11	4.26
Spring 2017 (14 Reporting)	0	0	0	8	6	4.43
Summer 2017 (10 Reporting)	0	0	0	3	7	4.70
Fall 2017 (42 Reporting)	0	1	3	25	13	4.19

xx. Understand the basic principles of mechanical, electrical and piping systems.

Semester	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Fall 2014 (8 Reporting)	0	0	1	4	3	4.25
Spring 2015 (28 Reporting)	0	0	5	11	12	4.25

Summer 2015 (21 Reporting)	0	0	4	13	4	4.00
Fall 2015 (20 Reporting)	1	1	4	8	5	3.79
Spring 2016 (21 Reporting)	0	1	4	6	10	4.19
Summer 2016 (24 Reporting)	3	0	1	13	7	3.88
Fall 2016 (27 Reporting)	0	1	3	11	12	4.26
Spring 2017 (14 Reporting)	0	0	3	6	5	4.14
Summer 2017 (10 Reporting)	0	0	0	4	6	4.60
Fall 2017 (42 Reporting)	1	0	5	26	10	4.05

b. Percentage of graduating students that agree they have met the learning outcome (responded either "agree" or "strongly agree")

i. Create written communications appropriate to the construction discipline.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	100%
Summer 2015 (21 Reporting)	0%	100%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	95%
Summer 2016 (24 Reporting)	0%	92%
Fall 2016 (27 Reporting)	0%	100%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	93%

ii. Create oral presentations appropriate to the construction discipline.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	96%

Summer 2015 (21 Reporting)	0%	95%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	95%
Summer 2016 (24 Reporting)	4%	92%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	98%

iii. Create a construction project safety plan.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	5%	80%
Spring 2016 (21 Reporting)	0%	100%
Summer 2016 (24 Reporting)	4%	83%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	93%

iv. Create construction project cost estimates.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	100%
Summer 2015 (21 Reporting)	0%	95%
Fall 2015 (20 Reporting)	5%	85%
Spring 2016 (21 Reporting)	0%	95%

Summer 2016 (24 Reporting)	0%	96%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	95%

v. Create construction project schedules.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	100%
Summer 2015 (21 Reporting)	0%	100%
Fall 2015 (20 Reporting)	5%	85%
Spring 2016 (21 Reporting)	0%	95%
Summer 2016 (24 Reporting)	0%	92%
Fall 2016 (27 Reporting)	0%	100%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	93%

vi. Analyze professional decisions based on ethical principles.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	93%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	90%
Spring 2016 (21 Reporting)	0%	81%
Summer 2016 (24 Reporting)	0%	88%
Fall 2016 (27 Reporting)	4%	93%
Spring 2017 (14 Reporting)	0%	100%

Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	98%

vii. Analyze construction documents for planning and management of construction processes.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	0%	95%
Fall 2015 (20 Reporting)	0%	85%
Spring 2016 (21 Reporting)	5%	95%
Summer 2016 (24 Reporting)	0%	83%
Fall 2016 (27 Reporting)	0%	100%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	95%

viii. Analyze methods, materials, and equipment used to construct projects.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	0%	95%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	90%
Summer 2016 (24 Reporting)	8%	83%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	0%	93%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	93%

ix. Apply construction management skills as a member of a multidisciplinary team.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	4%	93%
Summer 2015 (21 Reporting)	0%	95%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	100%
Summer 2016 (24 Reporting)	8%	79%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	95%

x. Apply electronic-based technology to manage the construction process.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	100%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	85%
Spring 2016 (21 Reporting)	0%	100%
Summer 2016 (24 Reporting)	8%	92%
Fall 2016 (27 Reporting)	0%	96%
Spring 2017 (14 Reporting)	7%	93%
Summer 2017 (10 Reporting)	0%	90%
Fall 2017 (42 Reporting)	0%	98%

xi. Apply basic surveying techniques for construction layout and control.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	10%	81%
Fall 2015 (20 Reporting)	5%	75%
Spring 2016 (21 Reporting)	0%	90%
Summer 2016 (24 Reporting)	4%	96%
Fall 2016 (27 Reporting)	4%	85%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	93%

xii. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	100%
Summer 2015 (21 Reporting)	0%	100%
Fall 2015 (20 Reporting)	0%	75%
Spring 2016 (21 Reporting)	0%	90%
Summer 2016 (24 Reporting)	4%	92%
Fall 2016 (27 Reporting)	0%	93%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	95%

xiii. Understand construction risk management.

Semester	Percentage of graduating students that agree they have met the learning outcome

	Disagree	Agree
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	90%
Spring 2016 (21 Reporting)	0%	86%
Summer 2016 (24 Reporting)	0%	92%
Fall 2016 (27 Reporting)	0%	93%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	93%

xiv. Understand construction accounting and cost control.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	89%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	5%	80%
Spring 2016 (21 Reporting)	10%	86%
Summer 2016 (24 Reporting)	8%	75%
Fall 2016 (27 Reporting)	7%	81%
Spring 2017 (14 Reporting)	0%	93%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	86%

xv. Understand construction quality assurance and control.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	Agree
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	93%
Summer 2015 (21 Reporting)	0%	90%

Fall 2015 (20 Reporting)	0%	75%
Spring 2016 (21 Reporting)	5%	81%
Summer 2016 (24 Reporting)	13%	67%
Fall 2016 (27 Reporting)	4%	81%
Spring 2017 (14 Reporting)	0%	93%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	93%

xvi. Understand construction project control processes.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	93%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	90%
Summer 2016 (24 Reporting)	8%	79%
Fall 2016 (27 Reporting)	0%	93%
Spring 2017 (14 Reporting)	0%	93%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	0%	93%

xvii. Understand the legal implications of contract, common, and regulatory law to manage a construction project.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	93%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	70%
Spring 2016 (21 Reporting)	0%	95%
Summer 2016 (24 Reporting)	4%	75%

Fall 2016 (27 Reporting)	4%	93%
Spring 2017 (14 Reporting)	0%	93%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	88%

xviii. Understand the basic principles of sustainable construction.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	75%
Spring 2015 (28 Reporting)	4%	89%
Summer 2015 (21 Reporting)	0%	76%
Fall 2015 (20 Reporting)	10%	65%
Spring 2016 (21 Reporting)	5%	86%
Summer 2016 (24 Reporting)	4%	63%
Fall 2016 (27 Reporting)	0%	89%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	90%
Fall 2017 (42 Reporting)	10%	67%

xix. Understand the basic principles of structural behavior.

Semester	**Percentage of graduating students that agree they have met the learning outcome**	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	100%
Spring 2015 (28 Reporting)	0%	96%
Summer 2015 (21 Reporting)	0%	90%
Fall 2015 (20 Reporting)	0%	80%
Spring 2016 (21 Reporting)	0%	95%
Summer 2016 (24 Reporting)	4%	83%
Fall 2016 (27 Reporting)	4%	89%
Spring 2017 (14 Reporting)	0%	100%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	90%

xx. Understand the basic principles of mechanical, electrical and piping systems.

Semester	Percentage of graduating students that agree they have met the learning outcome	
	Disagree	**Agree**
Fall 2014 (8 Reporting)	0%	88%
Spring 2015 (28 Reporting)	0%	82%
Summer 2015 (21 Reporting)	0%	81%
Fall 2015 (20 Reporting)	10%	70%
Spring 2016 (21 Reporting)	5%	76%
Summer 2016 (24 Reporting)	13%	83%
Fall 2016 (27 Reporting)	4%	85%
Spring 2017 (14 Reporting)	0%	79%
Summer 2017 (10 Reporting)	0%	100%
Fall 2017 (42 Reporting)	2%	86%

9. Interpreting Results

Please provide an interpretation of the results aligned with the student learning outcomes. The interpretation should reflect consideration of factors (e.g., capabilities of a particular cohort, innovative curricular change) that may have affected the results.

The discussion and resulting actions are set out in the Minutes of Annual Quality Improvement Meeting – see Appendix C.

10. Communicating Results

Please provide a very brief narrative describing with whom the results are shared (e.g., all program faculty).

A copy of the draft BSCI Degree Program Assessment Plan and Report for 2017 and copies of the summary of student exit interviews for calendar year 2017 were provided to all program faculty in electronic format several days before the annual quality improvement meeting held on May 4, 2018. These documents were used to stimulate discussion and encourage recommendations for quality improvement. All program faculty received an electronic copy of the minutes of the quality improvement meeting and were given the opportunity to make changes prior to them being included in this document as Appendix C.

Use of Results

11. Purposeful Reflection and Action Plan

Please provide a narrative describing the process in which faculty engage to discuss assessment results and create actionable plans in an effort to improve student learning.

The discussion and resulting actions are set out in the Minutes of Annual Quality Improvement Meeting – see Appendix C.

Appendix B – Curriculum Mapping

Pre-Building Science (PBSCI) Curriculum Mapping

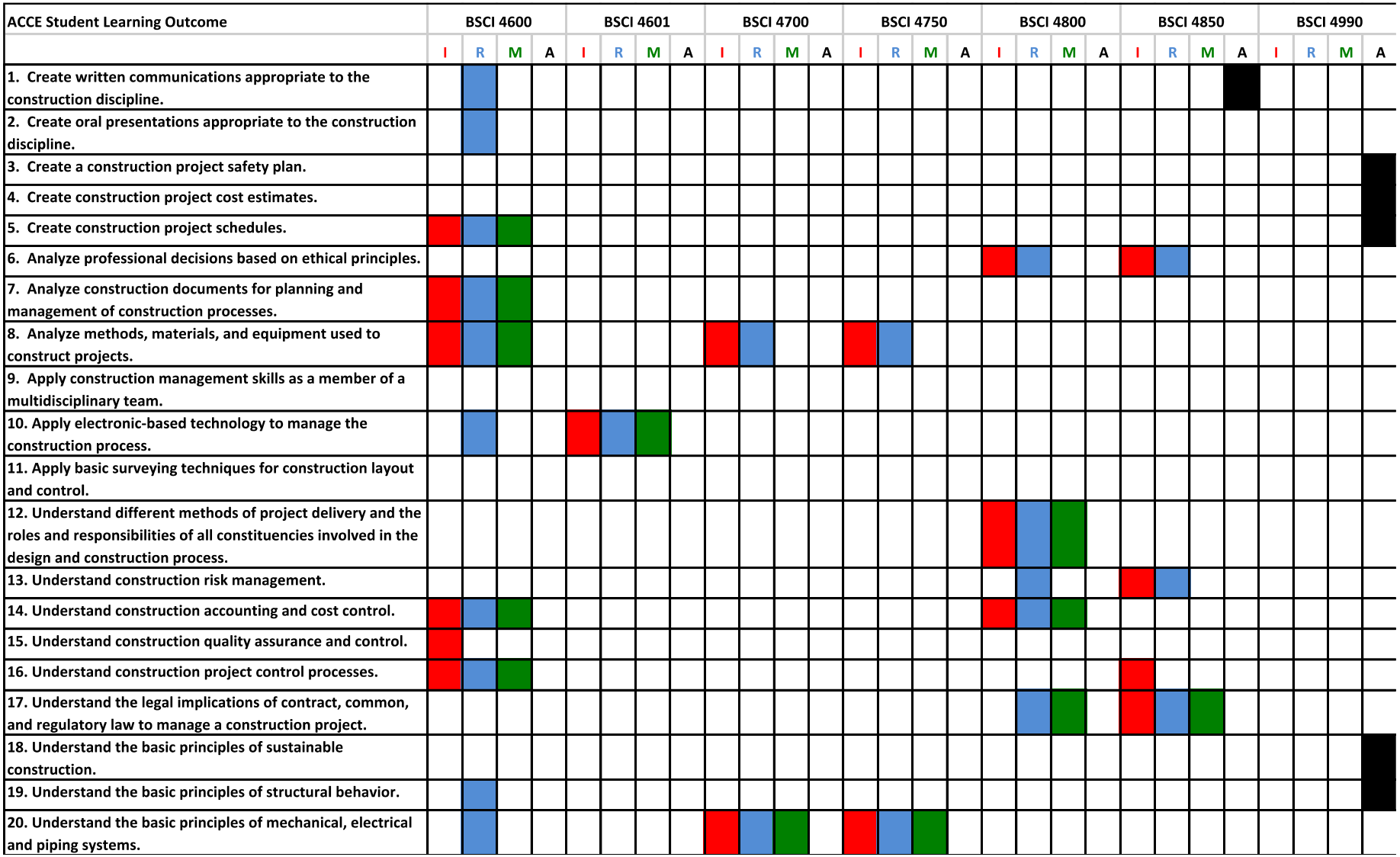
ACCE Student Learning Outcome	BSCI 1100				BSCI 2100				BSCI 2200				BSCI 2300				BSCI 2400			
	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A
1. Create written communications appropriate to the construction discipline.																				
2. Create oral presentations appropriate to the construction discipline.																				
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 multidisciplinary 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.																				

I = Introduce; R = Reinforce; M = Master; A = Assess

Building Science (BSCI) 3000 Level Classes Curriculum Mapping

ACCE Student Learning Outcome	BSCI 3300				BSCI 3420				BSCI 3430				BSCI 3500				BSCI 3600				BSCI 3650				BSCI 3700			
	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A	I	R	M	A
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 multidisciplinary 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.																												

Building Science (BSCI) 4000 Level Classes Curriculum Mapping



Appendix C – McWhorter School of Building Science - Minutes of BSCI Quality Improvement Meeting – May 4, 2018

McWhorter School of Building Science
BSCI Quality Improvement Meeting – May 4, 2018 10:00 – 2:00
Attending: Junshan Liu, Alan Bugg, Brandon Clarke, Richard Burt, Keith Rahn, Ben Farrow, Lauren Redden, Mike Hosey, Anoop Sattineni, Eric Wetzel, Salman Azhar, Mark Tatum, Tom Leathem, Jeff Kim, Mark Taylor, Wes Collins.

1) AU & ACCE Assessment Requirements – Richard Burt
   - Review schedule of implementing assessment of ACCE Student Learning Outcomes. See Section 5 **Outcome-Measure Alignment** of *Appendix B – Data for Assessment of Student Learning Outcomes Reported to the Auburn University Director of Academic Assessment.* The text is highlighted yellow.

Richard Burt gave an overview of the assessment process for both Auburn University and the American Council for Construction Education (ACCE). Copies of the current SLO implementation plan were shared with the faculty and a discussion followed. The plan was updated and the it was agreed that the following ACCE SLO's will be assessed for the first time during the upcoming academic year:

Student Learning Outcome	Where & How Assessed	Implementation Date	Action
7. Analyze construction documents for planning and management of construction processes.	BSCI 4990 – Thesis (2nd Semester, Senior Year). Construction Documents Assessment accounts for 10% of Thesis grade.	Fall 2018	**Leathem Kim Wetzel**
8. Analyze methods, materials, and equipment used to construct projects.	BSCI 4350 - Construction Project Analysis (First Semester, Senior Year). Project Method Statement accounts for 35% of course grade	Fall 2018	**Bugg**
9. Apply construction management skills as a member of a multi-disciplinary team.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). Collaborative Project accounts for 15% of course grade	Spring 2018	
	New curriculum - BSCI 3440, Structure of Buildings (First Semester, Junior Year) – II. Team Project	Fall 2018	**Wetzel Azhar**
10. Apply electronic-based technology to manage the construction process.	BSCI 4500 - Information and Communication Technology for Construction (CIT) (First Semester, Senior Year). – 2.	Fall 2018	**Sattineni**

	Final Project accounts for 20% of course grade		
13. Understand construction risk management.	BSCI 4850 Construction Law and Risk Management (2nd Semester, Senior Year). – Specific questions on Tests 2 & 3. Tests 2 & 3 account for 50% of course grade	Fall 2018	**Taylor**
14. Understand construction accounting and cost control.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). – Specific questions on Tests 2 & 3. Tests 2 & 3 account for 30% of course grade	Fall 2018	**Holley Wetzel**
15. Understand construction quality assurance and control.	BSCI 4350 Construction Project Analysis (First Semester, Senior Year). Quiz 2 accounts for 30% of course grade.	Fall 2018	**Bugg**
16. Understand construction project control processes.	BSCI 4610 – Scheduling and Field Operations (First Semester, Senior Year). – Specific questions on Tests 3. Test 3 accounts for 15% of course grade	Fall 2018	**Holley Wetzel**
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.	BSCI 4850 Construction Law and Risk Management (2nd Semester, Senior Year). – Specific questions on Tests 1, 2 & 3. Tests 1, 2 & 3 account for 75% of course grade	Fall 2018	**Taylor**
19. Understand the basic principles of structural behavior.	Current Curriculum - BSCI 4990 – Thesis (2nd Semester, Senior Year). Structural Assessment accounts for 5% of Thesis grade	Fall 2014	
	New curriculum - BSCI 3440, Structure of Buildings (First Semester, Junior Year) – II. Final examination accounts for 20% of course grade.	Fall 2018	**Azhar**

2) Actions taken from Spring 2017 Quality Improvement Meeting (Quality_Improvement_Spring_2017_Minutes.doc)
    a. From Review of Data for 2016 Calendar Year:

I. Response to student comments about BSCI 4750 Electrical Systems in Buildings

It was decided that faculty will meet with small groups of recent graduates to review content of current course. ***ACTION – Mark Tatum –***

Mark Tatum shared a handout with the faculty that documented the work that had been done to improve the quality of this class. The students perceptions of this class, assessed through exit surveys and interviews will be monitored as students taking this class graduate from the program.

II. Consistent positive perception of value of 'hands-on" learning and use of technology expressed in exit interviews.

It was decided that as part of the new BSCI 3660 Preconstruction & Project Management class that Procore mobile technology project management software would be incorporated. ***ACTION – Project Controls Team***

It was reported that the use of Procore software has been added to the Project Controls classes. In addition iPads have also been purchased for use in the project controls classes and these will support Procore and other mobile applications.

b. Faculty/Student suggestions:

I. Incorporation of sustainability topics into Mechanical & Plumbing Classes

It was agreed that additional sustainability topics would be introduced into BSCI 4700 Mechanical Systems starting in Fall 2017 in preparation of transitioning to the new curriculum. Dedicated Examination questions will be developed that address sustainability topics. ***ACTION – Keith Rahn –***

Keith Rahn provided handouts detailing how sustainability topics had been incorporated into BSCI 4700 and how these topics were assessed.

4) Review of Data for 2017 Calendar Year - BSCI Degree Program Assessment Plan and Report_2017_Quality_Improvement_Meeting.docx, Overall_Assessment_Data_Fall_2017_IAC.pdf & Exit Interview Notes

a) Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI
b) Goal 2: The McWhorter School of Building Science will provide an enriching educational experience consistent with the needs of its stakeholders.
c) Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry.

Faculty reviewed and discussed data presented in the above documents. There was some dialog on the variation of student performance between semesters, but no results fell below the performance criteria set last year.

5) Recommendations for Quality Improvements 2018/19
   a) From Review of Data for 2017 Calendar Year
   b) Faculty/Student suggestions

There was a thoughtful discussion on some of the limitations of the rubrics used in thesis and how faculty, particularly new faculty, who arrived after the rubrics were developed, were interpreting them. Following this discussion, these action items were agreed:

1. **Review and revision of current grading rubrics used in thesis.**

SLO #3. Create a construction project safety plan.
SLO #4. Create construction project cost estimates.
SLO #5. Create construction project schedules.
Will be reviewed by the Thesis Review Committee with a view to pilot testing any revised rubrics during the fall 2018 semester.

2. **New rubric to evaluate ACCE SLO #7 - Analyze construction documents for planning and management of construction processes**

Will be developed by the Thesis Review Committee with a view to pilot testing during the fall 2018 semester.

3. **Hold two thesis grading workshops for faculty during the fall semester.**

September 10, 2018 – Financial Documents – Paul Holley

October 8, 2018 – Estimating – Wes Collins

Appendix D - Mapping Changes of Student Evaluation of BSCI 1100 – Introduction to Construction

McWhorter School of Building Science – Mapping Changes of Student Evaluation of BSCI 1100 – Introduction to Construction

Quality Improvement Meeting – May 3, 2012

Students' comments about content of material included in BSCI 1100 History & Intro. to Construction (exit interviews and surveys)

This class has consistently received the lowest evaluations of any BSCI class when students complete their exit surveys. The course was partially revised last academic year when Professor Zabel taught the class. During the 2012/13 academic year the class will be taught by Darren Olsen who has revised the content further. We will submit a proposal to the AU curriculum committee for course revision and renaming to Introduction to Construction during the fall semester.

March 8, 2013 – Name change to "Introduction to Construction" and changes to course content approved by University Curriculum Committee.

Fall 2013 – Revised class offered for first time.

Responses to Exit Survey Question on Value of BSCI 1100

Below are specific and general subject areas that you took while enrolled in the BSCI program, please rate the value of each area to your educational experience:

1 Not Valuable at all
2 Seldom Valuable
3 Somewhat Valuable
4 Valuable
5 Highly Valuable
N/A

	2009			2010			2011			2012		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response	2.74		2.56	2.85	2.91	2.46	2.23	2.36	2.47	2.64	2.68	2.60

	2013			2014			2015			2016		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response	2.17	2.57	2.76	2.83	2.73	3.63	3.50	3.62	3.70	3.71	3.25	3.52

	2017			2018			2019			2020		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response	3.86	4.10	3.81									

Appendix E - Mapping Changes of Student Evaluation of SLO - *Organize LEED Green Building activities/ Understand the basic principles of sustainable construction.*

McWhorter School of Building Science – Mapping Changes of Student Evaluation of SLO - *Organize LEED Green Building activities/ Understand the basic principles of sustainable construction.*
Assessment Report for Building Science, BS, 2010

The learning outcome "Organize LEED Green Building activities" had a mean response of 2.54. Resolved during curriculum review by identifying a series of sustainable construction topics taught throughout the revised curriculum and a dedicated introduction to sustainable construction class.
March 8, 2013 – BSCI 2100 Introduction to Sustainable Construction course approved by AU Undergraduate Curriculum Committee
Fall 2013 – – BSCI 2100 Introduction to Sustainable Construction offered for first time
Responses to Exit Survey Question on meeting SLO 1.17 *Organize LEED Green Building activities.*
BSCI has an approved set of learning outcomes that set out what you should be able to do upon graduation. On a scale of 1 to 5, rate how strongly you agree or disagree that you are able to do the following:
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
N/A

	2009			2010			2011			2012		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response			2.54	3.23	2.98	2.89	2.58	3.03	2.79	3.08	3.54	4.00

	2013			2014		
	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response	3.00	3.43	3.69	3.57	3.20	

From Fall 2014 Responses to Exit Survey Question on meeting ACCE SLO 18. ***Understand the basic principles of sustainable construction.***

	2014			2015			2016			2017		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
Mean Response			4.25	4.29	4.00	3.75	4.24	3.92	4.19	4.29	4.50	3.86

Appendix F - Mapping Changes of Assessment of SLO - *Create a construction project safety plan.*

McWhorter School of Building Science – Mapping Changes of Assessment of SLO *Create a construction project safety plan.*

Quality Improvement Meeting Report May 6, 2015

6) Recommendations for quality improvements 2015/16
   a) From Review of Data for 2014-15 Academic Year – Improvement to teaching and assessment of ACCE Learning Outcome *Create a construction project safety plan.*
      i. Since Fall 2014 there has been a requirement to develop project specific safety plans for all field labs and service learning projects in BSCI 3420 & 3430.
      ii. Re-write Thesis Guidelines and grading rubric for Safety for Fall 2015. **– Action – Mike Hosey & Richard Burt.**

Fall 2015 New Thesis Guidelines for Site Specific Safety Plan introduced. Existing grading rubric retained. Fall 2016 new grading rubric introduced.

Fall 2015*	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	12	6	6	0	0	1	**4.08**
Safety Manager	9	8	5	1	2	0	**3.84**
First Aid	13	4	3	1	2	2	**3.76**
Emergency Contacts	12	6	4	1	1	1	**3.96**
Accident Plan	11	8	3	1	1	1	**3.96**
Training	8	10	3	1	2	1	**3.72**
	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	7	7	9	1	1	0	**26.04**
Create a Safety Plan for compliance	8	10	5	0	1	1	**26.88**
					Total		**76.24**

Spring 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	16	11	2	0	1	0	**4.37**
Safety Manager	19	4	6	0	1	0	**4.33**
First Aid	19	5	4	0	2	0	**4.30**
Emergency Contacts	13	6	6	4	0	1	**3.83**
Accident Plan	17	5	3	1	1	3	**3.90**
Training	15	7	3	1	0	4	**3.80**
	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	13	11	3	1	1	1	**28.23**

Create a Safety Plan for compliance	9	12	7	1	0	1	**27.07**
					Total		**79.83**

Summer 2016	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Specifics of the Project	12	4	3	0	1	0	**4.30**
Safety Manager	9	8	1	2	0	0	**4.20**
First Aid	12	4	3	0	1	0	**4.30**
Emergency Contacts	14	4	1	0	1	0	**4.50**
Accident Plan	12	2	5	1	0	3	**4.25**
Training	11	6	0	1	2	0	**4.15**
	35	**28**	**21**	**14**	**7**	**0**	
Analyze Hazards	11	6	2	1	0	0	**30.45**
Create a Safety Plan for compliance	11	7	1	0	1	0	**30.45**
					Total		**86.60**

Fall 2016 (Revised Rubric)	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	12	8	4	0	0	0	**4.33**
Site Specific Safety Plan	7	15	2	0	0	0	**4..21**
Job Hazard Analysis	9	7	6	2	0	0	**3.96**
Hazardous Materials	9	10	4	1	0	0	**4.13**
Injury/Accident Plan	7	12	5	0	0	3	**4.11**
Total							**81.58**

Spring 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	15	3	2	0	0	0	**4.65**
Site Specific Safety Plan	12	6	1	1	0	0	**4.45**
Job Hazard Analysis	14	4	2	0	0	0	**4.59**
Hazardous Materials	15	4	1	0	0	0	**4.70**

Injury/Accident Plan	13	6	0	1	0	3	**4.55**
						Total	**91.90%**

Summer 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	11	3	0	0	0	0	**4.79**
Site Specific Safety Plan	7	7	0	0	0	0	**4.50**
Job Hazard Analysis	10	3	1	0	0	0	**4.61**
Hazardous Materials	11	1	2	0	0	0	**4.64**
Injury/Accident Plan	9	4	1	0	0	0	**4.54**
						Total	**88.2*%**

Fall 2017	**Grading Scale**						**Average**
	5	**4**	**3**	**2**	**1**	**0**	
Company Safety Policy	26	17	5	1	0	0	**4.39**
Site Specific Safety Plan	21	17	10	1	0	0	**4.18**
Job Hazard Analysis	20	17	9	2	0	0	**4.05**
Hazardous Materials	25	20	3	0	1	0	**4.39**
Injury/Accident Plan	19	18	10	2	0	0	**4.09**
						Total	**83.47%**

BSCI-4990 THESIS RULES & REGULATIONS

Effective for: Summer Semester - 2018

All thesis students are responsible for compliance with the requirements in this document. Specific requirements contained within this handout may not be omitted. Your thesis advisor must approve changes in the physical scope of the project in writing.

PRELIMINARY REQUIREMENTS

Project Approval

Prerequisites specified in the Auburn University Bulletin will be enforced. No course can be taken during the final term that conflicts with the scheduled Thesis course time. The Thesis student is responsible for completing a "Graduation Check" and verifying that all of the required course work has been satisfactorily completed.

The student must submit Project Plans with a Thesis Approval Form to the School of BSCI Office **no later than the last class day of the preceding academic term. No Project Plans will be approved during semester break.** A copy of the Approval form is located in Appendix A. Written approval is required prior to starting any thesis work. The approval form must be included in the thesis submittal as noted in the Thesis Assembly section of this document. Any project scope changes must be approved and noted on the approval form by the thesis reviewer at time of submission. Only one set of plans will be approved for each student. A student may apply for approval of a project up to two academic terms before graduation.

GENERAL REQUIREMENTS

Course Administration

Thesis Lab is in session during scheduled class time; a*ttendance will be taken during that time period.* A series of one-hour lectures relative to thesis will be conducted periodically by BSCI faculty and will be announced by e-mail. Attendance is mandatory for all thesis lectures. The lectures may cover the following topics: Estimating, Recap Sheets and Bid Forms, Scheduling, Contract Documents, Structural Assessments, Materials, Erosion Control and other related thesis topics as requested by the class. In addition, desk critiques with faculty and group meetings with faculty will occur on an ongoing basis. Attendance for all of these events is mandatory.

Three unexcused absences will be allowed without penalty. More than three will be reported to your thesis jury and will affect your final thesis grade. Absences will be excused at the discretion of your thesis advisor only as stated in the Syllabus.

The BSCI Thesis Laboratory is a space set aside for the use of the thesis students. The School of

BSCI acknowledges the effort it takes to complete an exceptional thesis project. Thesis students will have access to the Thesis Laboratory 24 hours per day, seven days per week unless the University schedules otherwise. A library atmosphere shall be maintained in the BSCI Thesis Laboratory. **Eating, drinking, smoking and spit cups are not permitted in Gorrie Center.** Radios without headsets are not permitted in the BSCI Thesis Laboratory.

For most Thesis class sizes, each student is entitled to one desk to work on. Desks and computer equipment are to remain as arranged by the thesis faculty so that the rooms can be used for an occasional class or exam. The computers in the Thesis Laboratory are protected by a fiber optic security system. This system does not allow for rearrangement of furniture or computers.

Computing Support

The computer is a valuable tool in the preparation of the thesis. The McWhorter School of BSCI recognizes that the students rely on computing to complete their thesis. Computers, printers, and plotters are available in Gorrie Center. The McWhorter School of BSCI maintains this equipment and will respond as quickly as possible to any problems. ***However, it is the student's responsibility to complete the project in a timely manner.*** Any failure of computer equipment is not an acceptable excuse for a late or incomplete thesis project. ***Students must make periodic backups to protect their respective progress. Students are completely responsible for their backup strategies***.

The School will provide all printing and plotter supplies. Each student should exercise caution and print only when necessary. **The printer is not a copy machine.** The more it is used, the more likely it will crash. **Do not open the printer for any reason! The printers are monitored 24/7. The cost of repairs due to student damage will be charged to the student and will have to be paid to be cleared for graduation.**

Job Placement Assistance

The industry recognition and appreciation of Auburn University Building Science is what attracts top construction firms to recruit. Your participation in the process is important to all of us. Companies will be making presentations and conducting interviews in Gorrie Center. Honor your job interview commitments or cancel well in advance. Broken commitments can result in problems with the contractors returning to campus in the future. More information is available at the Gorrie Center main office.

BSCI maintains an electronic job board cataloging jobs those firms that have job openings are available. Your communication with these firms should be professional and open. We also have current AGC and ABC national directories for your use.

BSCI Graduate Exit Interview

All students are **REQUIRED** to complete the graduate survey and participate in the exit interview process. The purpose is to continue to improve our program in all aspects; the input of our "most

recent alumni" is to ascertain their perspective on their experience in Building Science and to solicit their input and comments on the program and its future. A copy of the **graduate survey** must be completed online.

THESIS SUBMITTAL REQUIREMENTS

General Requirements

Thesis projects will be accepted until 10:00 a.m. on DATE TO BE ANNOUNCED. The thesis will be turned in to the thesis instructor in the Faculty Conference Room, where a drawing will be held to determine thesis juries.

Thesis jury hearings will be completed on or before dead day of that academic term (Time & Location, TBA). Submit your approved drawings and specifications with your completed thesis for grading. Drawings and specifications will be returned after jury hearings. **Your name should be clearly marked and easily found on the outside of all your submitted documents.** Theses receiving a passing grade will be made available for pick-up on graduation day in the School of Building Science. All remaining theses will become property of the School of Building Science. The School reserves the right to retain copies of Theses for quality control and accreditation requirements. The jury is a formal presentation and defense of the student's work. The student should be dressed as if making a formal presentation to a major prospective client. The student should take the RSMeans text used for pricing to the jury meeting.

The Thesis presentation should be of professional quality, as if you were presenting your company to a prospective client. **Your thesis document shall be in 8½" x 11" page format submitted in a "D" ring binder.** Your work should be neat, thorough and original. Improper grammar and misspelled words will lower your grade. Although all thesis work is to be your own, you may exchange ideas and discuss problems with other students. The faculty is available to answer questions appropriate to the courses they teach. The faculty will not, however, take the time to re-teach course materials. Nor will the faculty "pre-grade" portions of your thesis to "check if it has been done correctly." Refer to your class notes for any necessary review. You may also ask questions of contractors, architects, suppliers, and building industry officials, preferably those associated with your project.

THESIS ASSEMBLY

Assemble the thesis in logical order (i.e., chronological). Number all pages, **in ink**, including assumptions, worksheets and summary sheets, documents, and other information. A complete Table of Contents is required listing the sections, titles and page numbers. It should show all divisions of work contained in the worksheets and summary sheets. Worksheets and summary sheets will have a dual numbering system; one number system for the estimate itself and one for the thesis document. The typical work sheet and summary sheet heading areas should be complete.

Carefully plan sequencing and dating of all documents; i.e., Bid, Agreement, Bonds, Billing, etc., so that they are reasonable and consistent. You may assume any dates required to complete the thesis such as the bid date, project start date and company start date. A project time line is required.

Printing and formatting should be done with an attention to readability of the final product (rotating content to fit a page, size of fonts, size of margins, etc.). Your thesis reviewer may reduce your overall grade at their discretion for inadequate attention to this requirement.

Include your full name, as registered with the university, and thesis semester on both cover and title page. Anticipate binding room on each sheet of paper when copying or printing. Do not submit a machine copy of your thesis. **All documents must have original hand written signatures.**

Minimum Requirements / Thesis Assembly Model

The minimum requirements and recommended assembly for a complete thesis are as follows (do **NOT** use Appendix B – Thesis Evaluation & Grading Criteria as your Thesis Assembly outline):

Preliminary	Title Page A Complete Table of Contents w/ page numbers Thesis Proposal Approval Form Project Brief (include the original and revised versions) Assumptions Detailed Project Time Line of Events List of Student Selected Work w/ page numbers Approval form for Student Selected Work
Company	Company History, Philosophy and Goals Organizational Chart Duties of Key Personnel Contractor's Licenses Business Licenses (state and local)
Financial	Contractor's Qualification Statement Balance Sheet Income Statement - current and projected Financial Narrative including business position and strategies consistent with financial statements Financial Ratios and a thorough analysis of each: Net and Gross Margins, ROI, Current Ratio, Fixed Asset Newness, and Average Ages of Receivables and Payables Labor Burden Determination (home office and field) General Overhead Determination
Project Estimate	Specification Take-off / Drawing Notes Issues BIM Model of Structure, including Quantity Validation QTO Worksheets (***including Site Utilities)***

	Document earthwork quantities using "Earthworks" or other suitable program. Include printout of software including graphic image of cut/fill. Pricing Sheets ***including Site Utilities and unit prices (if required)*** Job Site Overhead Recap Sheet Bid Calculation Worksheets (base bid, alternates and unit prices) Explanation/Analysis of MEP systems Subcontract Scope Statement for MEP systems, addressed to applicable specialty contractor(s)
Project Documents	Master Surety Agreement Proposal Form with at least one alternate bid item Bid Bond Power of Attorney for Bond Agent Agreement Form (per your specs.) w/acceptance of one alternate Bond Application Form Performance and Payment Bonds Certificate of Insurance Project Specific Safety Plan (DO NOT include MSDS sheets) Sustainability Construction Assessment Subcontract Agreement Short Form (AGC) w/ detailed scope of Work and listing of project documents as attachments. Building Permit (not the application) Project Cash Flow Projection Submittal/shop Drawing Control Document CPM Activity Worksheets Schedule of Values Reports showing Period Costs for first three months, from which the pay applications are generated Change Order prompting, i.e. RFI, Architect's directive, etc. Change Order QTO, Pricing, Recap sheets, and cover correspondence to Architect Change Order (executed in first 3 months) Payment Requests (for first 3 consecutive months) Substantial Completion Documentation Consent of Surety to Release of Retainage (when appropriate) Affidavit of Release of Liens Affidavit of Payment of Debts & Claims Consent of Surety to Final Payment Certificate of Occupancy List of all required Warranties and at least two actual Warranties
Structural	Structural Assessment
Project Schedule	Color plot of original Bar Chart (with logic arrows), cost loaded, clearly indicating a timeline, all appropriate activities, their

	durations, total float, and ALL logic/lag ties [front and end] for each activity. Inclusion of Schedule Draft; to be returned to student upon submission of final project
Appendix	Site Utilization Plan (graphic and written narrative)
References	Reference all sources used in Thesis Attach a complete copy of the Thesis Instructions

Grading

Completing all the minimum requirements listed in the preceding section does not mean an automatic grade of "A". If all items are included and most of the items are reasonably correct, then the student can expect a grade of "C". Significant omissions and/or errors will result in a grade in the "D" range or an "F". Additional copies of the items listed in minimum requirements will not be considered "Student Selected Work". Per the University's definition, an "A" is for superior work.

Thesis projects will be presented to and defended before a faculty jury. The jury will evaluate the projects for:

1. Meeting the minimum requirements listed in the Thesis Instructions in a manner appropriate to the student's thesis project.
2. The accuracy and applicability of student selected work.
3. The integration of the minimum requirements and the student selected work into a cohesive whole.
4. The professional quality of the thesis document.
5. The professional quality of the student's presentation and defense.
6. The student's ability to explain the reason and meaning of each part of the thesis. **(If you don't know what it is, how it was developed, why it's there, and what it means, it lowers your grade!)**

The jury will assign a letter grade based on this evaluation. Possible grades are A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D- and F.

If the thesis is graded as an "F" (failure), the thesis will be retained. The School Head will determine whether the student is allowed to retake the course using another approved set of drawings and specifications. An "IN" (incomplete) will be assigned only if extenuating circumstances warrant and requires the School Head's approval and per University mandated criteria.

A thesis that is submitted on time but that is not complete, will be evaluated and given a grade appropriate to the degree of completion and the quality of the work submitted. A thesis that is submitted after the designated time, but prior to **11:00 am** on the due date, will be penalized by a letter grade reduction. Theses will not be accepted for grading after **11:00 am** on the date due and

an "F" will be assigned.

Project Brief

A brief overview of the project should be done prior to beginning your project. The brief is to be prepared as a formal business document summarizing the key project control aspects of your project directed to the owner of your construction company. The brief should address all of the following items:

- Identification of the 2 or 3 major risks on the job for your construction firm
- Identification of the work you plan to self-perform and what you plan to subcontract (you are encouraged to self-perform one trade)
- Identification of key dates: Bid, start, finish, etc.
- Identification of major site issues including earthwork requirements and site logistic issues if any exists
- Consideration for how quality will be measured
- Identification of 3 or 4 largest safety risks specific to this project
- Construction of a schedule of the key 10-15 items on the job (may be drawn by hand)

Along with the Project Brief, you are required to submit a separate document detailing your proposed "Student Selected Work". This document must include the following:

- Your name.
- A written description of the selected work and the tasks involved in its completion.
- Anticipated time that will be spent on completing the selected work.
- Provide a place on the document for the reviewing faculty to make comments and to approve or disapprove the proposal.

This approval document must be included within your final thesis. Refer to the section at the end of this document for more specifics regarding the Student Selected Work.

The content in your project brief must to be specific to the project, refer to specific contract documents, and use concise industry terminology. The evaluation of the project brief is not only of the student's knowledge of construction issues, but also the student's ability to clearly communicate in writing.

Project Brief shall be submitted via upload to Canvas by the end of class on DATE TO BE ANNOUNCED.

The Project Brief will be graded by a random faculty member. You may consult with that faculty member concerning your grade and receive feedback about your thesis. Following your consultation with faculty, revise your Project Brief. In your final thesis, include both the original and revised version of your Project Brief.

Company and Project Documents

All documents are to be fully executed as if real, and dated, signed and notarized where appropriate. The student is required to comply with all requirements contained within the contract documents by:

a. Compliance with the requirements, or
b. Written assumption concerning the requirement approved by the Thesis Professor.

The student may have to provide additional documents to meet the minimum requirements depending on their project.

The student is required to set up an organization that is capable of constructing their project. Be realistic in relating organization and overhead to annual construction volume, and use good management principles in staffing your organization.

An analysis and determination of the unique annual overhead, fee objectives, and labor burden for field and office employees must be clearly demonstrated and explained for the most recent complete year as well as the projected values for the duration of the thesis project.

The faculty strongly requests that multiple copies of forms or reports such as subcontracts and state licenses should be omitted. All information included should have a purpose and only one example of an executed document is required. However, pay requests are required for three months. Any additional pay requests are not considered extras and should not be included.

Students are encouraged to be creative and original in the development of forms, letterheads and other documentation. However, the creation of these items can have a negative impact if they cause excessive paper use or do not add to the overall appearance of the document. Remember, "Fluff is not a substitute for substance."

SPECIFICATION TAKE-OFF / DRAWING NOTES ISSUES

The student shall provide an analysis of all items that impact time, money, or other risks that are associated with, but not be limited to, supplemental conditions, general notes on drawings, and all specifications. The analysis shall be presented in the form of an internal memorandum directed toward company employees affiliated with this project.

COST ESTIMATE

All scope changes must be approved by the Thesis Instructor and noted on the plans. In addition, all approved scope changes must be noted as a separate subsection on the student's Assumptions Sheet document. Verbal approvals are not acceptable.

Each student is to create a comprehensive, detailed cost estimate for the selected thesis project.

Takeoff

The quantity survey can be accomplished using both manual and electronic tools. Tabulation of quantity takeoff into worksheets should be organized in such a manner as to allow intuitive review.

Quantity takeoff sheets should be organized by trades, each sheet should be limited to a single trade. Students need to utilize a consistent methodology and an easy to follow audit trail. The audit trail should seamlessly blend both manual and electronic takeoff. With manual takeoff the audit trail should include a plan reference and further dimensional and location and orientation information to allow reviewers to retrace your steps and verify quantities. If electronic means are used for quantity takeoff the audit trail should include an explicit reference to an appended document (Onscreen Takeoff sheets w/image legend) which clearly demonstrates how the quantities were derived and where they came from. In using electronic means (such as Onscreen Takeoff, BIM, Earthworks, etc.) to quantity items on the project, information must be provided in the description of each item quantified to accurately identify the specific construction item.
(For example: If quantifying interior gypsum partition construction items using Onscreen Takeoff, you should clearly define in the condition description for each partition type such as 1Hr FR, 6" Mtl Std 22ga, 5/8" Gypsum)

You will be required to justify your methodology for your calculated quantities. Waste and overages need to be considered on your quantity takeoff sheets. **Quantities for Divisions 3, 4 and 5, *must* be extracted from the BIM Model (see BIM GUIDELINES section for more information).**

Site work is a required item and must be estimated and priced in a detailed manner. In addition, it should be noted that site utilities and erosion control are to be taken off and priced as Site Work "subcontract" work. Proper analysis of the site work requirements is critical to the successful completion of a project. The student should understand the grading operations and the effects of shrinkage and swell. Using a cut/fill program is acceptable. However, the appropriate reports showing existing layers and volumes, proposed layers and volumes, structures, total cut and fill, existing elevation data and proposed elevation data must be included and incorporated in the thesis in an organized manner. It is required that the thesis student prepare a narrative in order to defend their understanding of earthmoving operations.

Do not take off demolition work, trees and shrubs in landscaping, lawn sprinkler systems, fire alarm and/or sprinkler systems, or any low voltage wiring. Include these items in the bid amount by estimating a lump sum price for each item. The thesis faculty will provide limited guidance in this area. Do not assume this work will not be accomplished. Be prepared to explain your approach to these lump sum prices.

You may design your own worksheets, summary sheets, and recap sheets as long as they are similar to those used in Project Controls. Worksheets, Summary Sheets, Job Overhead Sheets and Recap Sheets may be completed in pencil, but must be neat and legible. All estimating work should be self-explanatory to a reviewer and demonstrate an **easy-to-follow audit trail** throughout the estimate. Be sure to highlight totals on worksheets which are carried forward to summary sheets and totals on summary and job overhead sheets which are carried to the recap sheet indicating the page number of the destination in the appropriate manner. You will be required to justify your methodology, waste and conversion factors, and all computation in your estimate.

Pricing

You may use spreadsheet software to price all items in a format similar to the pricing sheets. Provide the pricing guide page number and line number after each item priced on the summary sheet. The reference column is for the work sheet number and should be provided for all items on the pricing sheets.

Pricing sheets should reference quantity takeoff sheets from which the quantities were derived. Pricing sheets should also be limited to a single trade per sheet. In no event should more than one trade be included on a pricing sheet, but often a single trade will require more than one sheet. It is appropriate to summarize cost information for each trade at the end of its last pricing sheet and then for that information to be forwarded to the recap sheet.

On-Screen Take-off, or other estimating software may be used to take-off and price all sections. All computer estimate reports should be produced in a manner to easily review the information. It will be the student's responsibility to clearly present the information in a format that shows the audit trail, crew designations and makeup, systems/work groups procedures, the pricing according to the current RSMeans being used, and proper calculation of unit prices and subcontractor mark-ups.

Develop "raw" (raw means no general contractor markup) prices for all work done at the project site including subcontracted work. You may estimate each subcontractor's total markup at 22% to 32% if the work is totally subcontracted; the mark-up is 40% and 45% if only labor and equipment are subcontracted. ***While these markup rates are somewhat arbitrary for this exercise, you have to show in some form (and be prepared to defend) what factors are included in the markup.*** Show subcontractor markup on the final pricing sheet for each trade. Highlight the subcontractor quote (including markup) and carry to Recap sheet.

The bid must include **at least two** alternates with the estimate and on the proposal form. If no alternates are listed in the specifications, the student is required to submit an addendum to the bid documents that creates the alternates. **One (1) alternate must be accepted in the agreement with the owner**.

Use the proposal form and the Bid Bond form from the project specifications, if provided.

As in industry, the alternate is accepted after bid day and before the contract is written. The student must prepare the prices for these items separately for the owner to select. The student can select which will be accepted.

You are required to show the calculations of any unit prices required on your bid for additive or deductive work. These unit prices should include markup. Also, show the calculations for contract change orders and alternate bid items including markup.

Special Pricing Considerations

Price all concrete by the cubic yard, rebar by the ton, and structural steel by the ton. The only exception is that the square foot/square yard pricing can be used for sidewalks and paving.

Connections for steel, wood, etc., may be estimated on the summary sheet as an adjustment to the quantity (additional materials). Use proper judgment by interpolating or adjusting RSMeans line items.

Determine the quantity and type of all wood and light gage metal roof trusses. Use the RSMeans pricing data for your truss pricing or an actual truss manufacturer quote. The contractor/subcontractor will still need additional material for bracing and labor to erect the trusses.

If it is necessary to adjust pricing in RSMeans, use proper judgment when interpolating between line items. Add price adjustments to your list of assumptions and be prepared to defend your methodology.

Recap

The recap sheet is "part and parcel" to the pricing sheet and in addition to summarizing the project's cost. It also provides a document that an estimator could use for bid day evaluation. Therefore, each line item on the recap sheet should be organized by trade. The recap sheet should reflect if the estimator plans to self-perform or subcontract the work. Recap sheets are used to add indirect cost and markups to the estimate. Recap sheets need to be produced for alternates, change orders and unit prices.

BIM GUIDELINES:

All thesis students MUST create a BIM model for the structure in their projects, as described below. Any BIM software available in the McWhorter School labs may be used.

Frame	Required	Not Required
Steel	Foundations, columns, beams, braces, load bearing walls, retaining walls, rebar (foundation & walls), elevated slab on deck, ground floor slab, OWSJ and joist girders	Connections, base plates, anchor bolts, partitions and other miscellaneous steel
Concrete Frame	Foundations, columns, beams, load bearing walls, retaining walls, rebar, elevated slabs, ground floor slab (foundation, beams, columns & walls)	Formwork, slab on grade outside the foot print of the building.
Wood Frame	All load bearing components of the building, foundations, rebar, braces	Partitions

Students **MUST** use quantities from the models above in their estimates (See thesis folder for formatting and quantity extraction instructions). When using electronic means for quantity

takeoff the audit trail should include an explicit reference to an appended document which clearly demonstrates how the quantities were derived and where they came from.

Students are to perform a quantity validation on one major component from the modeled components. The quantity validation must demonstrate a student's complete understanding of the use of BIM in quantification of construction items. The quantity validation is a check to ensure the accuracy of model extracted quantities versus the manual takeoff method. For example: one major component that may be selected to complete the quantity validation is the total cubic yards of slab-on-grade concrete extracted from the model and a manual takeoff comparison.

PROJECT SCHEDULE

The work plan and project schedule must correspond to the project's cost estimate. You must include CPM Activity Worksheets to justify activity costs.

A *draft project schedule* shall be completed and submitted no later than the end of class on DATE TO BE ANNOUNCED. It should contain a calendar timeline, and milestone activities with durations for the complete project including construction. The schedule should be represented in a clear, legible, organized manner, and it should follow standard CPM drawing conventions, contain a title block, date and legend, and not exceed a sheet size of 36"x 48". It will be submitted in a 9" x 12" manila envelope with the student's name, project name, thesis semester, and DRAFT SCHEDULE neatly and legibly written on the cover. This schedule will be inserted into the thesis when the thesis is submitted. **While this submission should be complete, it should be a draft that demonstrates your understanding of how the building will be assembled, and its relativity to your pricing of equipment, crews, and overhead. The draft should be in bar-chart form, should include a time scale plus all activities and logic ties. Obviously, your final schedule may (and likely should) reflect refinements to this draft. Make sure you retain or make a copy of the draft, as you will not be allowed to reference it after it has been submitted.**

Time-based items in the estimate must agree with the scheduled time frame of the project. The pay requests are derived from the cost loaded CPM schedule and are representative of the planned progress of the work. Each category of work must be planned and scheduled. The schedule should contain a sufficient number of activities (100 activities +/-, excluding procurement activities) for the Project Manager to coordinate the work on a weekly basis. The sequence of activities should represent the Project Manager's plan and follow standard construction practices. In addition, the schedule should show procurement activities including fabrication and delivery of critical and other time-sensitive materials to the jobsite in time not to delay the project.

Each activity must be assigned an earned value in order to produce an anticipated "Early Start Earned Value Curve." The student must include on this diagram an anticipated "Income Curve" based on the Early Start Earned Value Curve, as well as an anticipated "Actual Costs Curve". The student will then produce and include a report showing the cash flow projection of the project based on the plotted curves.

The student will assign a "Schedule of Value" code to each activity and produce a SOV report. The codes in this report will correspond with the G703 pay request cost items and agree with the pay request amounts. Therefore, if the schedule is updated, the earned value should equal the pay request amount without the stored material.

The student is required to update the schedule for the first three months of the project and produce a SOV report that verifies the pay request amounts based on "costs this period" as well as "costs to date."

For scheduling-related reports, the student shall include **only** the following: 1.) a Classic Schedule Report and a Detailed SOV Report for the initial, as-planned schedule, 2.) an updated Detailed SOV Report for each of the three updates.

Schedule Activity Worksheets should be sorted by activity and include totals for each activity as well as an overall total. A list of items not assigned to activities and included in the markup must be included as part of the schedule activity worksheets. The individual and total $ value of these items must be shown on the list.

PROJECT MANAGEMENT

Use the forms (Proposal, Bond, Contract, Pay Request, etc.) furnished with your specifications. If none are provided, use the latest version of AIA forms.

It is required to complete the pay request documents for the first three months of the project. Show stored materials on each request. It is not realistic for a job not to have stored materials in the early months.

The "Schedule of Values" for the pay request is a breakdown of the work for the owner to approve payments. The breakdown should identify the major subcontractors and/or work areas. SOVs limited to the 16 CSI Divisions are not acceptable.

Execute all documents (fill in all blank spaces including correct signature, stamps and seals). Clearly identify the drawings and specifications in the contract agreement. Do not include any documents that are not required by your project. **Use the AGC subcontract agreement form rather than the AIA document for your required subcontract.**

The thesis is to include a list of submittals and shop drawings for the project with identification of the vendor/party responsible for originating each and the scheduled/required delivery date for each submittal. This list is to be developed from the submittal requirements given in the project specifications. Major procurement items (+/- 10 each) should be included in the schedule.

The student is required to execute a change order during the first three months of the project. This change order will be reflected in the pay request(s) as is appropriate. The change order amount and scope of work will be at the student's discretion. The actual work required in the change order does not have to be accomplished during the first three months. The scope of the change order must be such that the contract duration and/or the contract sum is/are changed. The complete

process of prompting/correspondence with the Architect on aforementioned scope change is required. Worksheets and Summary Sheets showing the changes are required.

SITE SPECIFIC SAFETY PLAN

Company Safety Policy (10%):
Briefly state the importance of the health and safety of your employees to your company?
What is your company's Experience Modification Rate (EMR)? A new EMR is issued to companies each year by the National Council on Compensation Insurance (NCCI) based on the number and value of claims over the last three years. How does your present EMR effect your company? (Insurance premiums, OSHA fines, lost time, morale, litigation, job opportunities, etc.)

Safety Manager (10%):
How do you plan to access the hazards and regulate the safety program for this project?
Who is your safety manager?
Who does he report to?
How is safety information from this project communicated to upper management?
What is the role of each level of management in safety for this project?
What are the rules for non-compliance for the workers? Supervisors?

Planning (40%):

Initial Review - Job Hazard Analysis (JHA)
Perform an initial review of the project and select at least one hazard that is inherent with the project based on its location, topography, weather conditions, active campus, etc. Describe and give visual illustrations for the hazard and your method(s) of hazard mitigation. Include a risk assessment of the hazard.

Hazard	**A condition, set of circumstances, or inherent property that can cause injury, illness or death**
Risk	**An estimate of the combination of the likelihood of an occurrence of a hazardous event or exposure, and the severity of injury or illness that may be caused by the event or exposure**

Ongoing Review – Job Safety Analysis (JSA)
Perform a review of at least two hazards that will be encountered during the construction phase of the project due to nature of the work, construction procedures, hazards inherent with this type of construction, etc. Perform a Job Safety Analysis providing a step by step process of the work activity with hazards encountered at each step and mitigation measures to be enacted. Describe the OSHA standards that apply. Include visual illustrations. Explain why these two hazards are considered high risk on this project. Describe the specific training procedures required for your employees prior to engaging in these specific work processes and/or prior to their exposure to these specific hazards.

Hazardous Communication Program (20%):
How are you going to communicate information concerning the hazardous materials that will be encountered by your employees during the course of this project?
What is your plan for providing, maintaining, and updating the MSDS sheets as materials are brought onsite? DO NOT include printed MSDS sheets in the finalized thesis.
What is your policy on container labeling of materials?
What provisions have you made for the storage of hazardous materials during the construction phase?
Provide at least one example of how your hazardous communication process will work to inform and protect your employees from a specific hazardous material that will be used on your project during the course of construction. (Lead, silica, acetylene, gasoline, etc.)
Develop a Safety Data Sheet for the above substance and two additional hazardous materials on the project in accordance with the specified 16-section format that went into effect in June 2015 and with the Globally Harmonized System (GHS) pictograms.

Injury/Accident Plan (20%):
What is your plan to provide care for your employees if they are injured while working on this project?
Who are you going to contact when an accident occurs?
Where is the nearest hospital or source for emergency responders? Provide a map showing route and the distance/time to the facility.
What are you provisions for first aid? (First Aid Kits, Eyewash stations, trained personnel) Does the proximity of your jobsite require that a person trained in first aid be present to meet the OSHA requirements?
What are your procedures for accident investigation and reporting? (OSHA 301 form, accident recreation, interviews with witnesses, determination and elimination of the root causes of the accident)
Describe your accident prevention/rescue plan for one activity/hazard that will be encountered on this project (suspension trauma during steel/precast erection, confined space rescue plan, excavation cave-in, etc.) Tell how you have made preparations in advance so that you will be ready if an accident occurs.

STRUCTURAL ASSESSMENT

Structural System:

Include a conceptual assessment of the structural systems of the building. The assessment must provide a detailed explanation and identify the following:

a. The basic structural system for carrying vertical loads. Include diagrams that trace the path of vertical loads in the structure from roof to ground. A section view through a major axis of your building would be used for this. Make use of gravity force vectors of differing weights to indicate accumulation of load from roof to ground. A detailed verbal description must accompany the graphic one.

b. The basic structural system for carrying lateral loads (wind). Include diagrams that trace the path of lateral loads applied to the structure. A plan view of your building indicating

the reacting structural elements for wind load striking each of the major building axes is required. You should use different colors or separate diagrams for each wind direction. Show section views with wind load vectors for clear demonstration of how wind loads travel to the ground. A detailed verbal description must accompany the graphic one.

Special Structures (for students with wood/metal pre-fab trusses or pre-engineered metal buildings)

a. For students with pre-engineered metal buildings, substitute traditional steel members for prefabricated members and complete the following:
    a. Develop a paragraph indicating the substitutions you plan to make (bar joists for typical purlins, wide flange members for girders, etc.)
    b. Determine the required size of members noted in a.
    c. Develop a price for the structure sized in (b).
    d. Develop a paragraph indicating the difference in the cost of the structure between your approach in the estimate and your answer in (c). Reflect on the differences.
b. For students with wood/metal pre-fab trusses, complete the following:
    a. Select a typical truss and sketch an elevation of that truss. Select a possible layout of web members. Show all dead and live loads applied to the truss on a plf basis along the top and bottom chord or as a point load at truss joints. Essentially, indicate the vertical load on a horizontal projection of the truss.
    b. Produce a plan(s) of trusses showing all required temporary bracing. You may use any accepted national standard for bracing such as Alpine's "Builders Guide for Trusses".
    c. Design and provide a sketch for the diagonal brace at the end of the truss that takes the force to the ground. (This item may also be used for the temporary bracing design requirement of the thesis.)

Temporary Structure:

Students must provide one detailed structural analysis of a temporary structure such as that identified below, such as the concrete formwork for one of the major building components, elevated slab, wall, beam or slab. The analysis must include detailed load determination, selection of appropriate materials, and structural analysis, including strength, stiffness and stability considerations. A virtual model of the temporary structure should be provided. The work should also include a temporary compression ground brace for wall or truss system: size and spacing of braces must be determined considering lateral (wind) loads, slenderness ratio, strength analysis, connectors and anchorages, etc.

- Example 1: Trench shoring: determine soil lateral loads, design sheeting, wales and shores considering slenderness, strength, and deformations.

- Example 2: Elevated slab formwork design: determine all sources of gravity loads to design sheathing, joists, stringers, and shores, considering strength and stiffness. Stability must be considered in slenderness of shores and system stability in lateral bracing of overall shoring system.

- Example 3: Wall or column form: determine all loads to calculate lateral form pressures, and design sheathing, studs, wales and ties considering strength and stiffness. . Determine lateral stability.

MECHANICAL, ELECTRICAL AND PLUMBING

Provide a complete ***scope of work*** for HVAC, Plumbing, and Electrical contracts. The intended audience for each scope of work is the applicable specialty contractor.

Provide descriptions of the HVAC, Plumbing, and Electrical systems shown in your project. Include the following as a minimum:

HVAC System:

(1) Describe the components of the system or systems (AH, VAV, RTU, Chiller, cooling tower, piping, pumps, type of duct, etc.).
   A. The purpose of each component.
   B. How the component works.
   C. How the components work together.
(2) Discuss the controls of the system and who installs the controls.
(3) Discuss the process of the cooling cycle through the system.
(4) Discuss the process of the heating cycle through the system.
(5) Discuss the energy conservation measures, if any, for the building.
(6) Why was this system used as compared to another?
(7) Discuss the impact of the HVAC system on the schedule.

PLUMBING System:

(1) Potable water supply source, waste discharge point for sanitary and storm.
(2) Type and location of water pipes.
(3) Type and location of sanitary sewer pipes.
(4) Discuss the pumps in the systems.
(5) Discuss any controls in the system.
(6) Discuss the hot water source and distribution (re-circulation or non-re-circulation)
(7) Discuss the impact of the plumbing system on the schedule.

ELECTRICAL System:

(1) List service amperages and voltage to the MDP.
(2) List operating voltage(s).
(3) Describe the control systems.
(4) Describe the electrical from the entrance, meter, and/or MDP through the sub-panels.
(5) Describe the building equipment needs other than lights and receptacles (pumps, AH, Chiller, RTU, elevators, etc.).
(6) Describe the types and locations of conduit.
(7) Describe the emergency power system.
(8) Discuss the impact of the electrical system on the schedule.

The estimate for the MEP portion of the project may be completed with a cost per square foot price (from Means) for the MEP subcontracts.

SUSTAINABLE CONSTRUCTION ASSESSMENT

You are to conduct an assessment of your project building to demonstrate that you understand how the design and construction of your building reflects the basic principles of sustainable construction. Set out below are specific tasks to complete that relate to principles of sustainable construction. You are to answer these as they relate specifically to your building.

1. The USGBC through its LEED certification program has different certification programs for different construction projects.
    a. Select the current certification program that would be applicable to your construction project and locate and reference at least two resources or tools from the USGBC website that set out the requirements of the specific certification program.
2. During construction a contractor should consider the environmental impacts of construction activities on the site and its surroundings. A LEED Pre-requisite on any LEED certified project is *to reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust*.
    a. Review you project documents to identify any national, state or local requirements that control site erosion and sedimentation.
    b. Identify 6 specific measures incorporated into your project that reduce pollution from construction activities. Describe how each measure helps to reduce pollution using illustrations obtained from project documentation or other sources.
3. Sustainable construction projects seek to minimize non-renewable energy consumption, protect water resources and conserve water consumption. This is accomplished through good design and operating the building using sound environmental practices. A LEED Pre-requisite on any LEED certified project is to provide fundamental commissioning and verification to *support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability*.
    a. Review you project documents to identify and summarize any specific requirements related to commissioning and verification.
    b. Review the document *New Construction Building Commissioning Best Practice* by the *Building Commissioning Association*. Identify and describe the contractor's commissioning responsibilities during the construction phase for a project such as yours.
    c. Identify 6 pieces of commissioned equipment from your project that might be included in the construction checklist and describe the specific commissioning process for at least one piece of equipment.
4. Sustainable construction projects seek to use environmentally preferable products in the construction process. The LEED certification process seeks to minimize *the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials* and gives credit for using construction

products that provide *building product disclosure and optimization.*

a. Choose 3 construction products used in your project that you believe are environmentally preferable.
b. Locate the product manufacturers website and use the information available to explain how these products seeks to minimize *the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials*

5. Another sustainable construction principle is to reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.
    a. Identify 3 material streams used in your project where waste materials could be diverted from landfill or incineration.
    b. Describe with specific reference to your project how the 3 waste materials streams will be collected during the construction phase and processed locally after they leave the site. Your description should include a site utilization plan highlighting key features specific to waste management (i.e. dumpsters, salvage material lay down)
6. The quality of the indoor environmental is essential in sustainable construction projects. LEED certification seeks to *promote the well-being of construction workers and building occupants by minimizing indoor air quality problems associated with construction and renovation.* This is achieved by developing and implementing an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building.
    a. Identify the requirements and procedures and describe how you would protect the air distribution system (for example ductwork) during construction.
    b. Give an example specific to your project and describe how you would protect absorptive materials stored on-site and from moisture damage.

Related References:

1. http://www.usgbc.org/cert-guide
2. http://www.bcxa.org/wp-content/pdf/BCA-Best-Practices-Commissioning-New-Construction.pdf
3. http://apps.necanet.org/files/NECA090_2004.pdf
4. http://your.kingcounty.gov/solidwaste/greenbuilding/construction-demolition.asp
5. http://www.mcaa.org/green/Construction_IAQ_Final.pdf
6. http://cbcs-ky.com/doc/IAQPlan2-9-2011.pdf

STUDENT SELECTED WORK

Students are required to add relevant information into their thesis document. The information should be insightful and provide the faculty with additional understanding concerning the project or the construction process as seen by the student. All student selected work must be pre-approved at the time the Project Brief is turned in (refer to the section for Project Brief delievrables). The Student Selected Work submitted should involve **approximately 40 hours of work** completed by the student. Time spent working and assisting other students will NOT be

considered valid student selected work. Examples of "Student Selected Work" are listed below:

E-Portfolio:

Students are strongly encouraged to engage the use of the e-Portfolio as a "reflection" exercise of the work they are completing within the Building Science thesis. More about the ePortfolio project can be obtained at the Office of University Writing.

Cost Analysis:

The student can identify a component of the building and do a value analysis to determine which system may be better to use. The analysis needs to address the cost of the item, its effect on the schedule and the life cycle cost. The important thing to remember is to identify and analyze various systems. The project can remain the same.

Temporary Structures:

In addition to the information required in the Structural Assessment section, the student could do in-depth investigations of several areas. Trenching, bracing wood trusses, bracing masonry walls, structural steel bracing and shoring could all be studied as they relate to your specific project. The complete design could include sketches, citations from applicable codes or OSHA sections, connection details, construction sequencing and other relevant information.

Scheduling:

Project planning is an area that the student could explore. Creating a detailed Work Breakdown Structure which represents the organization of the project is acceptable. This plan should be reflected in the actual schedule that is required.

Creating a detailed Two-week Schedule that deals with a specific operation or area of the project could also enhance the thesis. This schedule could be used by the superintendent to direct field personnel or coordinate subcontractors. This could also represent a project meeting schedule where the actions of the last week and the next two weeks would be discussed. This schedule would be more detailed that the overall project schedule, but represent the activities that need to be completed during the time period.

APPENDIX A: BSCI 4990 – THESIS PROPOSAL APPROVAL FORM (version 1-7-13)

This form is to be submitted **directly to the BSCI Office**, along with drawings and separately bound specifications. The student is encouraged to submit the drawings and specs. on a USB drive in PDF format. The Thesis Instructor will make notations on this sheet as to their approval and any special requirements. After the project has been approved, the BSCI Office will return a copy of this form and the plans/specs/cd to you and retain a copy of this form for filing. If disapproved, the plans/specs/cd and form will be returned to you. The Building Science Office phone number is **(334) 844-4518**.

Today's Date: _____ Semester & Year you will take Thesis: _____

Full Name of Student (as in AU Banner): _____ AU e-mail: _____

Exact Title of Project on Plans/Specs: _____

Name of Architect: _____ Date of Plans: _____

Architect's Project #: _____ Location of Building, City: _____ State: _____

Cost of Project: _____ (Should be between $1,000,000 and $3,000,000)
Use actual bid figures or A/E's or G.C.'s estimate/budget.

Building Floor Area (should be approximately 9,000 - 12,000***** s.f.) _____ No less that 7,000 s.f. of the area must have finished floors, partitions, walls and ceilings. ***** BIM Thesis is a minimum of 15,000 s.f.

Types of buildings that <u>do not</u> lend themselves to be good Thesis projects and <u>will not be approved</u>:

- Pre-engineered roof trusses and wall systems
- Pre-engineered metal buildings or pre-cast walls
- Branch banks
- Wal-Mart or supermarket type buildings
- Drug Store projects (CVS, Walgreens, etc.)
- Houses or Apartments

Select **Yes** or **No** to the following questions.

	Yes	No
Required Items for Thesis Proposal Approval:		
Do you have a complete set of bound Specifications, Division 0 thru Mechanical/Electrical/Plumbing?	___	___
Do you have the following forms in the General Conditions: Bid Proposal, Agreement?	___	___
Do you have complete Civil drawings (u.g. utilities, grading, parking, elevations, erosion control, etc.)?	___	___
Do you have complete Architectural drawings (doors & windows, interiors, ceiling, elevations, etc.)?	___	___
Do you have complete Structural drawings (foundations, floor & roof framing, wall sections, etc.)?	___	___
Do you have complete Mechanical drawings (HVAC, ductwork, equipment schedules, piping, etc.)?	___	___
Do you have complete Electrical drawings (lighting fixture schedule, power, panel board schedule, etc.)?	___	___
Do you have complete Plumbing drawings (non-pressure & pressure piping, fire protection, etc.)?	___	___
Required Items for *<u>Thesis Class</u>* (strongly recommend inclusion in Thesis Proposal):		
Do you have a *Geotechnical Report*?	___	___
Do you have any *Formwork* required such as retaining wall, elevated slab, columns, etc.?	___	___
Do you have a *Finish Hardware* schedule in the specifications or listed on the drawings?	___	___
Do you have any *Alternates* in the Bid Proposal and/or specifications?	___	___
For BIM Thesis only: Do you have *CAD drawings* and *digital specifications*?	___	___

Student Comments Regarding Proposal: _____
_____

BSCI Office Approval: _____ Date: _____

BIM Thesis Faculty Approval: _____ Date: _____

Thesis Instructor Approval: _____ Date: _____

Thesis Instructor Comments & Special Requirements for approval: _____
_____
_____

Appendix B - Thesis Evaluation & Grading Criteria (Updated:8/16/2016)

	Student Name:		Pts.		
Pts.	**Each Subpart (In Blue) will be graded as a unit with the weight of**			**5%**	**LEED Assessment**
Received	**Subpart shown in 1st column**				LEED Certification Selection
		A 10-point scale will be used with this grading criteria			Environmental impacts of construction activities on the site
		Completing all the minimum requirements does not mean an automatic grade of "A".			Commissioning
		If ALL items are included and most of the items are reasonably correct, then the student can expect a grade of "C".			Environmentally preferable products
		Significant omissions and/or errors will result in a grade in the "D" range or an "F".			Construction waste management
	10%	**General Overview**			Indoor environmental quality
		Understanding the Plans			
		Understanding the Specifications		**15%**	**Project Administration**
		Understanding Materials			
		Understanding Methods			Proposal Form with at least one alternate bid item
		Organization of the Book			Change Order (executed in first 3 months)
		Appearance of the Book			Change Order prompting, i.e. RFI, Architect's directive, etc.
		Misc. Factors			Change Order QTO, Pricing, Recap sheets, and cover correspondence to Architect
					Agreement Form (per your specs.) w/acceptance of one alternate
	5%	**Project Brief**			Schedule of Values Reports showing Period Costs for first three months, from which the pay applications are generated
		Refer to Page 7 in Rules & Regulations document for content required			Payment Requests (for first 3 consecutive months)
		Refer to Rubric 6 for written comm. Evaluation criteria			List of all required Warranties and at least two actual Warranties
					Subcontract Agreement Short Form (AGC) w/ detailed scope of Work and listing of project documents as attachments.
	5%	**The Thesis & Company Items**			Explanation/Analysis of MEP systems
		Title Page			Subcontract Scope Statement for MEP systems
		Table of Contents with page numbers			Project Cash Flow Projection & Analysis
		Thesis Proposal Approval Form			
		Assumptions			
		Spec Takeoff - Division 1 & Plan Notes Issues		**5%**	**Project Documents**
		Detailed Project Time Line			Master Surety Agreement
		List of Student Selected Work w/page numbers			Bid Bond
		Company History, Philosophy, and Goals			Power of Attorney for Bond Agent
		Organizational Chart			Bond Application Form
		Duties of Key Personnel			Performance and Payment Bonds
		Contractor's Licenses (State and Local)			Certificate of Insurance
		Reference all sources used in Thesis			Building Permit (not the application)
		Project Brief			Submittal/shop Drawing Control Document
					Substantial Completion Documentation
	10%	**Financial**			Consent of Surety to Release of Retainage (when appropriate)
		Contractor's Qualification Statement			Affidavit of Release of Liens
		Income Statement - current and projected			Affidavit of Payment of Debts & Claims
		Financial Narrative including business position and strategies consistent with financial statements			Consent of Surety to Final Payment
		Financial Ratios and a thorough analysis of each: Net and Gross Margins, ROI, Current Ratio, Fixed Asset Newness, and Average Ages of Receivables and Payables			Certificate of Occupancy
		Labor Burden Determination (home office and field)			
		General Overhead Determination		**10%**	**Project Schedule**
					CPM Activity Worksheets (activities derived from cost estimate, cost loading the schedule, SOV #s, etc.)
	15%	**Project Estimate**			Full Plotted Schedule, (critical path, procurement activities, etc.)
		Document earthwork quantities using "Earthworks" or other suitable program. Include printout of software including graphic image of cut/fill.			Site Utilization Plan (Graphic & Written Narrative)
		Classify Materials and Methods by Trades			
		Calculate Building Quantities		**5%**	**Structural**
		Choose appropriate Technology for Creating Estimate			Identify the structural components of a building
		BIM Model			Identify common methods of stabilizing structural frames
		Create an Estimate			Classify Loads on Buildings
					Trace the path of vertical and lateral loads through structural components of a post and beam building
	5%	**Safety Plan**			Design and Construct strong, stiff & stable temporary structures and formwork
		Specifics on the Project			Calculate Internal member forces in structural elements of buildings
		Emergency Contacts			Determine internal stresses on structural bending elements
		Safety manager			
		First Aide		**10%**	**Student Selected Work**
		Emergency Plan			Requires 40 hours of work for full credit.
		Regulations			(i.e., LEED, BIM, pictures with narrative, etc)
		Create a Safety Plan			
		Create a Plan for Compliance			
		Total Points =			
		Grade =			

Appendix B, Rubric 1: Estimate

Name:

Criteria	Key Metric	Grading Scale 5	4	3	2	1	Student Score
Classify Materials and Methods by Trades	Recapped and organized estimate according to appropriate trades	All items organized well and assigned to appropriate trade	Minor errors in organzation and classification only	One key item with significant organization or classification issues	2-3 key items with significant organization or classification issues	More than 3 key items that wer organized or classified poorly	
Calcuate Building Quantities	Is it complete?	All items were addressed correctly	All items addressed, but some minor errors were made in the QTO	One major omission or error in the QTO (may also include minor errors)	2-3 key omissions or errors in the QTO (may also include minor errors)	More than 3 key omissions or errors in the QTO (may also include minor errors)	
Choose Appropriate Technology for Creating Estimate	There is a consistent level of detail through the estimate, and the audit trail is obvious	Solid choices were made for creating the estimate. A consistent level of detail and audit trail are clear and well developed.	Generally good choices were made to create the estimate. Some minor errors in level of detail or audit trail may be present.	One major issue associated with choice of technology for the esitmate. Inconsistencies in level of detail or the audit trail occur.	2-3 inconsitencies in level of detail or the audit trail.	Significant issues with level of detail or audit trail throughout the estimate.	
BIM Model	Are required items included in the model, the quantities obtained appropriately validated, and integration of quantities into the estimate documented?	Model is complete. Quantity validation for one major component complete. Integration of all quantities extracted is clearly documented with an audit trail.	Model is generally complete. Quantity validation for one major component is missing. Integration of most quantities extracted is clearly documented with an audit trail.	Model lacks 2-3 key items. Quantity validation for one major component is missing. Integration of quantities extracted contains one major error with regards to documentation and audit trail.	Model lacks 2-3 key items. Quantity validation for one major component is missing. Integration of quantities extracted contains 2-3 major errors with regards to documentation and audit trail.	Model lacks a significant number of key items. Quantity validation for one major component is missing. Integration of quantities extracted contains more than 3 major errors with regards to documentation and audit trail.	
Create an Estimate	QTO, Pricing, Recap, Alternates, Bid Proposals, Documents	All required items are included, and no errors or omissions are evident	Only minor errors or ommissons noted	One key item with significant errors or omissions	2-3 key items with significant errors or omissions	More than 3 key items that were omitted or entered with errors	
Total Score	(Sum of all points above)		**This score to overall rubric**				
% of total Points	(Total Score/25)						

Appendix B. Rubric 2: Sustainability

Name:

Criteria	Key Metric	Grading Scale 5	4	3	2	1		Student Score
LEED Certification Program Selection	Correct Program Selected							
Environmental impacts of construction activities on the site (5Points)	Identify requirements that control site erosion and sedimentation.	All project specific reqs identified	Most project specific reqs identified	Some project specific reqs identified	Reqs identified are not project specific	Some generic non project specific reqs identified	No reqs identified	
	Identify and describe 6 specific measures	6 project specific measures identified and fully described and illustrated	Less than 6 project specific measures identified and/or descriptions lacking detail	Less than 4 project specific measures identified and/or descriptions lacking detail	Measures identified and described but are not project specific	Measures identified but little attempt to describe them	No measures identified	
Fundamental commissioning and verification (5Points)	Identify and summarize project commissioning & Verification requirements	Documents reviewed and all reqs identified					No evidence of project docs review	
	Identify and describe contractors responsibilities	Identification and description consistent with best practice	All responsibilities identified and some description	All responsibilities identified	Some responsibilities identified but little description	Some responsibilities listed	No responsibilities identified	
	Identify 6 pieces of equipment and describe one process in detail	6 pieces of equipment identified and process well described	6 pieces of equipment identified and process somewhat described	6 pieces of equipment identified	4 pieces of equipment identified	2 pieces of equipment identified	No equipment identified	
Environmentally preferable products (5 Points)	Choose 3 environmentally preferable products	3 products correctly identified					No products identified	
	Explain how products are environmentally preferable	Website information used to explain all ways the 3 products reduce environmental impact	Website information used to explain some of the ways ways the 3 products reduce environmental impact	Website information used to explain some of the ways 2 products reduce environmental impact	Non-product information used to explain some of the ways 3 products reduce environmental impact	Non-product information used to explain some of the ways 2 products reduce environmental impact	No explanation	
Reduce construction waste (5 Points)	Identify 3 material streams	3 material streams identified					No material streams identified	
	Describe how materials collected and processed	Collection & processing of material streams for all 3 are described & are project specific	Collection & processing of material streams for all 3 are described but are not project specific	Collection & processing of material streams for 2 are described & are project specific	Collection& processing of material streams for 2 are described but are not project specific	Only 1 Collection & processing of material stream described	Collection and processing not described	
	Site utilization plan for CWM	Site utilization plan shows project specific locations of dumpsters, salvage material lay down etc. for all 3 streams	Site utilization plan shows project specific locations of dumpsters, salvage material lay down etc. for 2 streams	Site utilization plan shows project specific locations of dumpsters, salvage material lay down etc. for 1 stream	General information about locations of dumpsters, salvage material lay down etc. given but not project specific		No site utilization plan	
Indoor air quality (IAQ) management plan (5 Points)	Identify requirements and procedures and describe protecting the air distribution system	Requirements, and procedures are project specific and description is consistent with industry best practice		Requirements, and procedures are not project specific and description is not consistent with industry best practice			No Requirements, and procedures identified	
	Example of protecting absorptive material	Example is project specific and description is consistent with industry best practice		Example is not project specific and/or description is not consistent with industry best practice			No example given	

Total Score	(Sum of all points above)		**This score to overall rubric**					
% of total Points	(Total Score/25)							

Appendix B, Rubric 3: Structure

Name :

Criteria	Key Metric	Grading Scale 5	4	3	2	1	Student Score
Identify the structural components of a building	Verbal description of structural system that includes graphic depiction in either 2D or 3D	All key structural elements are identified along with their function. A clear understanding of structure is presented.	Description covers almost all structural components of the structure with most member functions addressed. The student has an understanding of items presented.	Approximately half of the members are identified with function shown. The student lacks some understanding of the structure.	Key elements of the structure are not included in the description and a lack of understanding of components is evident.	Key structural elements are not identified. Student lacks an understanding of components of the building.	
Identify common methods of stabilizing structural frames	Verbal description of lateral system that includes graphic depiction in either 2D or 3D	Lateral load resisiting system is clearly identified. Student illustrates how load is transmitted to lateral system.	Lateral load resisting system is clearly identified. A lack of clarity is present in how the load is transmitted to the system.	Lateral system is address but is not complete. Student does not have clear connection with how lateral load is transmitted to the foundation.	Lacks sufficient detail in the lateral load system of the buidling. A lock of understanding is present.	Fails to identify correct lateral system and does not attemp to identify lateral load flow.	
Classify Loads on Buildings	Verbal and graphical depiction of building loads	All dead loads, live loads, and wind loads are corectly shown on the building.	Loads shown on building are generally correct but lack sufficient detail for full credit.	Either dead loads, live loads, or wind loads are incorrect.	Two of three key loads are incorrect or not suffiiciently addressed.	Loads on the buidling are not clear or are not adddressed.	
Trace the path of vertical and lateral loads through structural components of a post and beam building	Verbal and graphical depiction of building loads	All loads are shown clearly transmitting to the ground.	Load paths shown are generally correct but lack sufficient detail to confirm all are resolved to the ground.	Load paths shown have minor errors or lack clarity.	One load case is not resolved to the ground. Others are generally correct.	Neither gravity or wind loads are resolved to the foundation.	
Design and Construct strong, stiff, & stable temporary structures and formwork	Temporary structure analysis	Temporary structure design is complete and accurate	Temporary structure design lacks minor details or has minor errors	Temporary structure design lacks at least one major componetn or has one major flaw	Temporary structural design is not complete or multiple errors are present	Lack of understanding of temporary structure design and construction	
Calculate internal member forces in structural elements of buildings	Temporary structure analysis	Forces for all elements were determined and sufficiently resolved.	Forces for all elements were determined, but some were not resolved.	Most member forces were determined and resolved.	Major errors are present in the structure analysis of forces in temporary members.	Little or no effort was made to determine internal member forces within temporary structural members.	
Determine internal stresses on structural bending elements	Temporary structure analysis	All members for temporary structure have internal stresses identified and sufficiently resolved.	All members for temporary structure have internal stresses identified but may not be sufficiently resolved.	Most members in the temporary structure have internal stresses identified and resolved.	Major errors are present in the structure analysis of stresses in temporary members.	Little or no effort was made to determine internal member stresses within temporary structural members.	

Total Score	(Sum of all points above)		**This score to overall rubric**				
% of total Points	(Total Score/35)						

Appendix B, Rubric 4: Safety

Criteria	Key Metric	Grading Scale						Student Score
		5	4	3	2	1	0	
Create Company Safety Policy (maximum of 0.5 points)	Policy statement of safety in company culture, Company EMR and its importance	Clear, concise, well organized safety policy statement with discussion of EMR	All required information addressed with minor errors or omissions	Missing some key information or contains major errors	Only some required information addressed	Little required information addressed	No required information addressed	
Compose Site Specific Safety Plan (maximum of 0.5 points)	Identify safety manager, safety management reporting chain, roles and responsibilities of company management and supervision, actions to be in response to safety violations	Clear, concise, well organized safety management process with all required information included and well organized	All required information addressed with minor errors or omissions	Missing some key information or contains major errors	Only some required information addressed	Little required information addressed	No required information addressed	
Create Job Hazard Analysis (JHA) (maximum of 2 points)	Identify hazardous activities specific to the project and formulate ways to eliminate/mitigate hazards	Two job specific hazards are identified. Hazards are clearly defined using construction documents and OSHA standards. JHA correctly addresses actions to eliminate or mitigate identified hazards	Two job specific hazards are identified. Hazards are somewhat defined using construction documents and OSHA standards. JHA addresses actions to eliminate or mitigate hazards with minor errors	Two job specific hazards are identified. Hazards are poorly defined or OSHA standards not used. JHA addresses actions to eliminate or mitigate hazards with major errors	Only one job specific hazard is identified or hazards are not job specific. JHA fails to address actions to eliminate or mitigate hazards.	Jobsite hazards are general and do not apply to the project. general and not specific to project. JHA fails to address actions to eliminate or mitigate hazards	No required information addressed	
Develop Hazardous Communication Program (maximum of 1.0 point)	Communicate information on hazardous materials to workers, location and access to MSDS sheets, labeling and storage of hazardous materials	Clear, concise, well organized hazard communication program that includes all required information	All required information addressed with minor errors or omissions	Missing some key information or contains major errors	Only some required information addressed	Little required information addressed	No required information addressed	
Create Site Specific Injury/Accident Plan (maximum of 1.0 point)	Provisions for first aid, evacuation plan for severely injured workers, accident investigation and reporting, location and contact information of nearest hospital and emergency responders	Clear, concise, well organized site specific injury/accident plan that includes all required information	All required information addressed with minor errors or omissions	Missing some key information or contains major errors	Only some required information addressed	Little required information addressed	No required information addressed	
This score to overall rubric								
(max 5 points)								

Appendix B, Rubric 5: Schedule

Name:

Criteria	Key Metric	Grading Scale 5	4	3	2	1	Student Score
Develop Work Breakdown Structure at Consistent and Appropriate Level of Detail	Thoughtful and Consistent Listing of Activities, Grouped Appropriately	All Project Components (including Procurement) Broken Down at Sufficient Detail by which to Direct the Trades, and at a Consistent level of Detail	Minor errors or omissions in breaking down components into activities	1 to 2 key ommissions or errors in breaking down or organizing the project components	3 - 5 ommissions or inconsistencies in key components into activities	More than 3 key components that were broken down poorly or at an inconsistent level of detail	
Calculate and Apply Reasonable and Appropriate Durations	Are Durations Reasonable Relevant to Crew Sizes, and to the Overall Project Duration?	All activities assigned a reasonable duration based on logical crew sizes and overall project duration	1 - 2 minor errors in the assignment of reasonable duration, causing minor problems with sequence and/or the critical path	1 or 2 problematic errors with key activity durations, causing issues with overall sequence and the critical path	3 - 5 problematic errors with key activity durations, causing issues with overall sequence and the critical path	More than 5 significant errors in assignment of durations, causing significant problems with overall sequence and the critical path	
Assign Relationships and Constraints Demonstrating Understanding of the Building and Site's Sequence	Major Phases of the Project (Site, Structure, Skin, Rough-In, and Finishes) have Relativity in Sequence	Overall, and at a detailed level, sequencing of all activities is logical and efficient	Reasonably well sequenced, with only 1 or 2 minor relationships or constraints causing issues that could be improved	1 or 2 major sequencing issues that are causing notable problems with overall project sequence	3 - 5 major sequencing issues caused by questionable or improper relationships or constraints	Significant issues with relationships and sequencing in general, resulting in a project schedule that is improbable or seriously questionable	
Leverage the Software Platform to Appropriately Reflect the Information, Sequence, Critical Path	Critical Path Illuminated, Relationships Shown, Numerical Data Shown (duration, Start Date, Float), and Sequence Understood Easily	CPM Software Platform Output demonstrates a mastery of its use	Output is reasonably susccessful, with only one or two minor issues with the software use reflected	1 or 2 significant issues with the student's facility in the software reflected	3 - 5 significant issues with the use of the software reflected	Submission shows serious lack of understanding or facility with the use of the platform in articulating a project schedule	
Create a Comprehensive Project Schedule	Submission Shows a Comprehensive Understanding of the Building and Site Components, Their Sequence and Constructability, and Represented Properly in the Software Platform	A well organized Work Breakdown Structure (including Procurement) with reasonalbe durations and relationships/logic applied, all demonstrated with mastery of the software	Only minor errors, ommissons, inconsistencies, and/or problems noted	Only 1 or 2 significant errors, ommissons, inconsistencies, and/or problems noted	3 - 5 major errors, ommissons, inconsistencies, and/or problems noted	Student does not demonstrate minimal ability to effectively create a comprehensive project schedule	
Total Score	(Sum of all points above)		**This score to overall rubric**				
% of total Points	(Total Score/25)						

Appendix B, Rubric 6: Written Communication Rubric - BSCI 4990 Project Brief

Name:

Criteria	Key Metric	Grading Scale 5	4	3	2	1	Student Score
Context of and Purpose for Writing	Includes considerations of audience (owner of general construction company), purpose, and the circumstances surrounding the project brief.	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses on all elements of the work.	Demonstrates good consideration of context, audience, and purpose and a clear focus on the assigned task (e.g. task aligns with audience, purpose and context)	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task (e.g. task aligns with audience, purpose and context)	Demonstrates some awareness of context, audience, purpose, and to the assigned tasks (e.g. begins to show awareness of audience's perceptions and assumptions)	Demonstrates minimal attention to context, audience, purpose, and the the assigned tasks	
Content Development	Relevant and compelling project specific content	Uses appropriate, relevant and compelling project specific content to demonstrate mastery of the subject.	Uses appropriate, relevant and compelling project specific content to explore ideas within the context of the writing.	Uses appropriate and relevant project specific content to develop and explore ideas through most of the writing.	Uses appropriate and relevant project specific content to develop simple ideas in some parts of the writing.	Content is not project specific, relevant nor appropriate in the majority of the writing.	
Disciplinary Conventions	Formal and informal rules inherent in the expectations for writing in the construction discipline	Demonstrates detailed attention to and successful execution of a wide range of conventions within construction management including organization, content, presentation, formatting, and stylistic choices.	Demonstrates consistent use of important conventions particular to construction management including organization, content, presentation, and stylistic choices	Follows expectations appropriate to the construction discipline for basic organization, content, and presentation.	Attempts to use a consistent system for basic organization and presentation.	Does not meet expectations appropriate to the construction discipline for basic organization, content, and presentation.	
Sources and Evidence	Uses reliable sources that are project specific to develop ideas appropriate for the construction discipline	Demonstrates skillful use of high-quality, credible and relevant project specific sources to develop ideas in the writing.	Demonstrates consistent use of high-quality, credible and relevant project specific sources to develop ideas in the writing.	Demonstrates an attempt to use of high-quality, credible and relevant project specific sources to develop ideas in the writing.	Demonstrates an attempt to use project specific sources to develop ideas in the writing.	Few or no project specific sources are used to support the ideas in the writing.	
Control of Syntax and Mechanics	Solid language that communicates meaning with clarity and fluency	Uses language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the writing has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in the usage.	Paper is difficult to read or follow due to significant errors in the usage of words and phrases in the document.	
Total Score	(Sum of all points above)		**This score to overall rubric**				
% of total Points	(Total Score/25)						

Summary Assessment Data for BSCI Program Goals & Objectives
Presented to BSCI Industry Advisory Council – April 25, 2018

Definitions:

A goal is an overarching principle that guides decision-making. Objectives are specific, measurable steps that can be taken to meet the goal.

3.1 Goal 1: Enhance the quantity & quality of incoming students to PBSCI & BSCI (AU Strategic Goal 2)

- Objective 1.1: Increase the number of high school students accepted to PBSCI
- Objective 1.2: Increase the number of freshman enrolling in PBSCI
- Objective 1.3: Increase the number of unrepresented students in the McWhorter School of Building Science.
- Objective 1.4: Increase the academic ability of students entering PBSCI & BSCI
- Objective 1.5: Increase the number of students enrolled in PBSCI & BSCI

3.2 Goal 2: The McWhorter School of Building Science will provide an enriching educational experience consistent with the needs of its stakeholders.

- Objective 2.1: Implement and assess a student learning outcomes based curriculum consistent with the standards of the American Council for Construction Education and the needs of stakeholders
  Objective 2.2: Increase opportunities for students to have an enriching educational experience through involvement in high impact education practices

3.3 Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry. (AU Strategic Priority 1 – Strategic Goal 1G)

- Objective 3.1: Enhance advisement & preparedness for a career in construction management
- Objective 3.2: Enhance assistance to students to obtain entry-level construction management positions within the southeast United States and beyond
- Objective 3.3: Increase placement of graduates in entry-level positions across diverse sectors of the construction industry.

	Freshmen Admissions		
Year	No. Accepted	No. Enrolled	Yield Rate
Fall 2014	86	59 (37 from 86)	43%
Fall 2015	82	76 (76 from 82)	93%
Fall 2016	106	69	65%
Fall 2017	114	81	71%

	Number & Percentage of unrepresented groups in undergraduate program									
Year	Females		African American		American Indian		Asian		Hispanic	
Fall 2014	25	6%	10	2%	5	1%	1	0%	5	1%
Fall 2015	26	6%	9	2%	3	1%	3	1%	8	2%
Fall 2016	32	6%	9	2%	4	1%	6	1%	20	4%
Fall 2017	34	6%	8	1%	4	1%	7	1%	22	4%

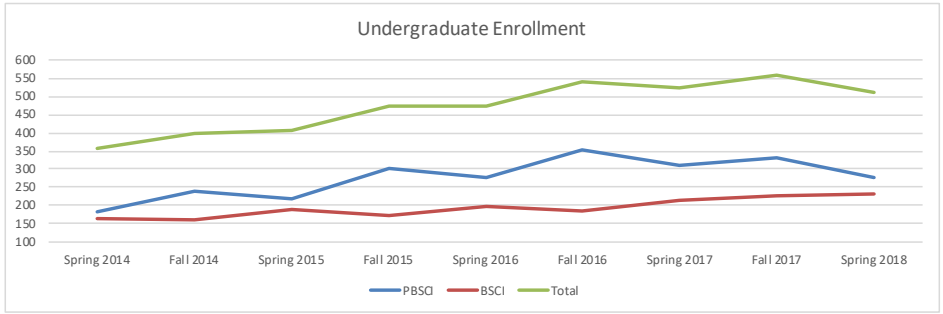
	ACT Scores of Incoming Freshman			
Year	Average	Min.	Max.	AU Average
Fall 2014	24.6	18	33	27.0
Fall 2015	24.96	19	33	27.3
Fall 2016	26.33	21	32	27.4
Fall 2017	25.7	18	34	27.3

Formula GPA for incoming BSCI students

Semester	Average	Min.	Max.
Spring 2014	2.92	2.31	3.82
Summer 2014	3.08	2.22	3.76
Fall 2014	3.38	3.06	4.00
Spring 2015	2.98	2.3	3.94
Summer 2015	2.97	2.2	3.72
Fall 2015	3.36	2.5	3.94
Spring 2016	3.13	2.38	4.00
Summer 2016	3.11	2.22	4.00
Fall 2016	3.53	3.12	3.94
Spring 2017	3.35	2.94	4.00
Summer 2017	3.11	2.84	3.88
Fall 2017	3.66	3.36	4.00
Spring 2018	3.46	3.14	3.96

Student Enrollment

Semester	PBSCI	BSCI	Total
Spring 2014	183	164	357
Summer 2014	60	133	193
Fall 2014	239	161	400
Spring 2015	219	188	407
Summer 2015	45	144	199
Fall 2015	300	173	473
Spring 2016	279	196	475
Summer 2016	60	146	206
Fall 2016	353	186	539
Spring 2017	309	213	522
Summer 2017	40	165	205
Fall 2017	332	226	558
Spring 2018	278	232	510



What is your overall satisfaction with the education you received in the Building Science program?

Semester	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied	Average
Fall 2014	0	0	0	5	3	4.38
Spring 2015	0	0	0	10	18	4.64
Summer 2015	0	0	2	8	11	4.43
Fall 2015	0	1	2	8	9	4.25
Spring 2016	0	0	2	12	7	4.24
Summer 2016	0	2	2	11	9	4.13
Fall 2016	0	0	0	12	14	4.48
Spring 2017	0	0	0	5	9	4.64
Summer 2017	0	0	0	3	7	4.70
Fall 2017	0	0	1	19	22	4.50

Did you participate in a service learning experience as part of a BSCI class?

	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	25	3	89%
Summer 2015	20	1	95%
Fall 2015	20	0	100%
Spring 2016	19	2	90%
Summer 2016	23	1	96%
Fall 2016	26	1	96%
Spring 2017	14	0	100%
Summer 2017	9	1	90%
Fall 2017	39	3	93%

Semester	Not at all prepared	A little prepared	Somewhat prepared	Quite a bit prepared	Very much prepared	Average
Fall 2014	0	0	1	2	5	4.50
Spring 2015	0	0	1	8	19	4.64
Summer 2015	0	0	1	6	14	4.62
Fall 2015	0	1	3	8	8	4.15
Spring 2016	0	2	1	9	9	4.19
Summer 2016	0	1	4	12	7	4.04
Fall 2016	0	0	3	9	15	4.44
Spring 2017	0	0	3	5	9	4.64
Summer 2017	0	0	0	4	6	4.60
Fall 2017	0	0	3	23	16	4.31

Did you participate in a study abroad program or another international experience as part of the Building Science Program?

	Yes	No	% Participation
Fall 2014	3	5	38%
Spring 2015	3	25	11%
Summer 2015	7	14	33%
Fall 2015	3	17	15%
Spring 2016	6	15	29%
Summer 2016	7	17	29%
Fall 2016	5	22	19%
Spring 2017	8	6	57%
Summer 2017	7	3	70%
Fall 2017	20	32	24%

Did you participate in an industry internship or co-op while you were in the Building Science Program?

	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	25	3	89%
Summer 2015	18	3	86%
Fall 2015	19	1	95%
Spring 2016	17	4	81%
Summer 2016	21	3	88%
Fall 2016	25	2	93%
Spring 2017	12	1	86%
Summer 2017	10	0	100%
Fall 2017	35	7	83%

Did you participate in a student competition while you were in the Building Science Program?

	Yes	No	% Participation
Fall 2014	5	3	63%
Spring 2015	17	11	61%
Summer 2015	10	11	48%
Fall 2015	6	14	30%
Spring 2016	8	13	38%
Summer 2016	7	17	29%
Fall 2016	9	18	33%
Spring 2017	6	8	43%
Summer 2017	2	8	20%
Fall 2017	17	25	40%

Did you create an ePortfolio while you were in the Building Science Program?

	Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	28	0	100%
Summer 2015	17	4	81%
Fall 2015	20	0	100%
Spring 2016	21	0	100%
Summer 2016	18	6	75%
Fall 2016	24	3	89%
Spring 2017	13	1	93%
Summer 2017	10	0	100%
Fall 2017	40	2	95%

Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry.

Semester	Did you seek advisement through BSCI Career Office? Yes	No	% Participation
Fall 2014	7	1	88%
Spring 2015	20	8	71%
Summer 2015	13	8	62%
Fall 2015	10	10	50%
Spring 2016	15	6	71%
Summer 2016	6	18	25%
Fall 2016	22	5	81%
Spring 2017	5	9	36%
Summer 2017	6	4	60%
Fall 2017	23	19	55%

Semester	No. of students advised per. semester PBSCI	BSCI	GRAD	OTHER
Spring 2015	13	11	4	0
Summer 2015	0	1	1	0
Fall 2015	34	19	7	4
Spring 2016	15	16	1	4
Summer 2016	2	0	2	1
Fall 2016	15	14	13	1
Spring 2017	9	29	1	3
Summer 2017	0	3	3	0
Fall 2017	25	14	3	1

Semester	Did you submit a Resume to AU Career Development Center? Yes	No	% Participation
Fall 2014	5	3	63%
Spring 2015	14	14	50%
Summer 2015	12	9	57%
Fall 2015	13	7	65%
Spring 2016	13	8	62%
Summer 2016	12	12	50%
Fall 2016	9	18	33%
Spring 2017	0	14	0%
Summer 2017	5	5	50%
Fall 2017	13	29	31%

Semester	Number of Company Presentations per semester Companies presenting	Students attending
Fall 2014	14	144
Spring 2015	11	133
Summer 2015	0	0
Fall 2015	8	64
Spring 2016	7	92
Summer 2016	0	0
Fall 2016	10	88
Spring 2017	8	77
Summer 2017	0	0
Fall 2017	5	55

Semester	Did you attend a company presentation in Gorrie prior to attending an on campus interview? Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	24	4	86%
Summer 2015	14	7	67%
Fall 2015	18	2	90%
Spring 2016	17	4	81%
Summer 2016	17	7	71%
Fall 2016	20	7	74%
Spring 2017	10	4	72%
Summer 2017	8	2	80%
Fall 2017	25	17	60%

Semester	Number of companies attending campus interviews (not inc. expo)	Number of companies attending BSCI Career Expo
Fall 2014	14	62
Spring 2015	11	60
Summer 2015	1	22
Fall 2015	7	77
Spring 2016	6	72
Summer 2016	0	21
Fall 2016	11	85
Spring 2017	9	77
Summer 2017	0	19
Fall 2017	5	90

Semester	Did you attend a company interview in Gorrie? Yes	No	% Participation
Fall 2014	8	0	100%
Spring 2015	24	4	86%
Summer 2015	12	9	57%
Fall 2015	15	5	75%
Spring 2016	17	7	67%
Summer 2016	14	10	58%
Fall 2016	19	8	70%
Spring 2017	9	5	65%
Summer 2017	6	4	60%
Fall 2017	20	22	48%

Semester	Number of students attending BSCI Career Expo PBSCI	BSCI	MBC/MIDC	Other	Total
Fall 2014	147	103	17	57	324
Spring 2015	47	78	17	68	210
Summer 2015		64		2	66
Fall 2015	171	101	17	61	350
Spring 2016	94	104	7	65	270
Summer 2016		37			37
Fall 2016	161	86	15	67	326
Spring 2017					286
Summer 2017		82	16	0	98
Fall 2017	183	122	11	95	411

Semester	Did you attend a BSCI Career Expo? Yes	No	% Participation
Fall 2014	7	0	100%
Spring 2015	27	1	96%
Summer 2015	20	1	95%
Fall 2015	20	0	100%
Spring 2016	21	0	100%
Summer 2016	24	0	100%

Semester	Sector of industry –recruiting on campus Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	66%	3%	6%	9%	16%
Spring 2015	66%	2%	11%	9%	12%
Summer 2015	83%	4%	4%	0%	9%
Fall 2015	72%	9%	6%	3%	10%
Spring 2016	69%	8%	3%	3%	17%
Summer 2016	80%	10%	0%	0%	10%

Goal 3: The McWhorter School of Building Science will advise, prepare and provide assistance for all students to obtain entry-level positions across diverse sectors of the construction industry.

Student Exit Surveys

Have you formally accepted a job offer?	Yes	No	Placement %
Fall 2014	8	0	100%
Spring 2015	27	1	96%
Summer 2015*	19	2	90%
Fall 2015	18	2	90%
Spring 2016* (3 graduate school)	17	4	81%
Summer 2016* (1 graduate school)	20	4	83%
Spring 2017	11	3	78%
Summer 2017	7	3	70%
Fall 2017	39	3	93%

BSCI Career Office Tracking

Semester	Students Interviewed	Job offer or grad school	Placement %
Fall 2014	19	19	100%
Spring 2015	29	29	100%
Summer 2015	24	24	100%
Fall 2015	26	26	100%
Spring 2016	30	30	100%
Summer 2016	29	29	100%
Spring 2017	31	27	90%
Summer 2017	22	16	77%
Fall 2017	49	44	90%

Student Exit Surveys

	No. of Formal Job Offers		
Year	Average	Min.	Max.
Fall 2014	1.75	1	3
Spring 2015	2.04	1	4
Summer 2015	1.67	0	5
Fall 2015	2.1	1	6
Spring 2016	2.29	0	6
Summer 2016	2.09	0	5
Fall 2016	1.41	0	3
Spring 2017	2.07	0	5
Summer 2017	1.5	0	3
Fall 2017	1.95	0	7

AU Graduating Senior Exit Survey

Have you located employment that you will begin or continue upon graduation?

		AU Rank
2014/15	92%	1
2015/16	93%	1
2016/17	92%	1

Student Exit Surveys
Sector of industry

Year	Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	88%	0%	0%	13%	
Spring 2015	93%	4%	0%	4%	
Summer 2015	81%	14%	0%	5%	
Fall 2015	95%	5%	0%	0%	
Spring 2016	81%	5%	10%	5%	
Summer 2016	88%	8%	4%	0%	
Fall 2016	75%	4%	4%	4%	
Spring 2017	86%	7%	0%	7%	
Summer 2017	90%	0%	0%	0%	
Fall 2017	83%	5%	5%	7%	

Student Exit Surveys
Initial Hiring Position

Year	Pre-construction	Project Management	Field Operations
Fall 2014	25%	63%	13%
Spring 2015	14%	68%	18%
Summer 2015	19%	48%	33%
Fall 2015	5%	45%	50%
Spring 2016	14%	48%	38%
Summer 2016	8%	58%	33%
Fall 2016	11%	70%	19%
Spring 2017	0%	50%	50%
Summer 2017	10%	50%	40%
Fall 2017	12%	67%	21%

BSCI Career Office Tracking
Sector of industry

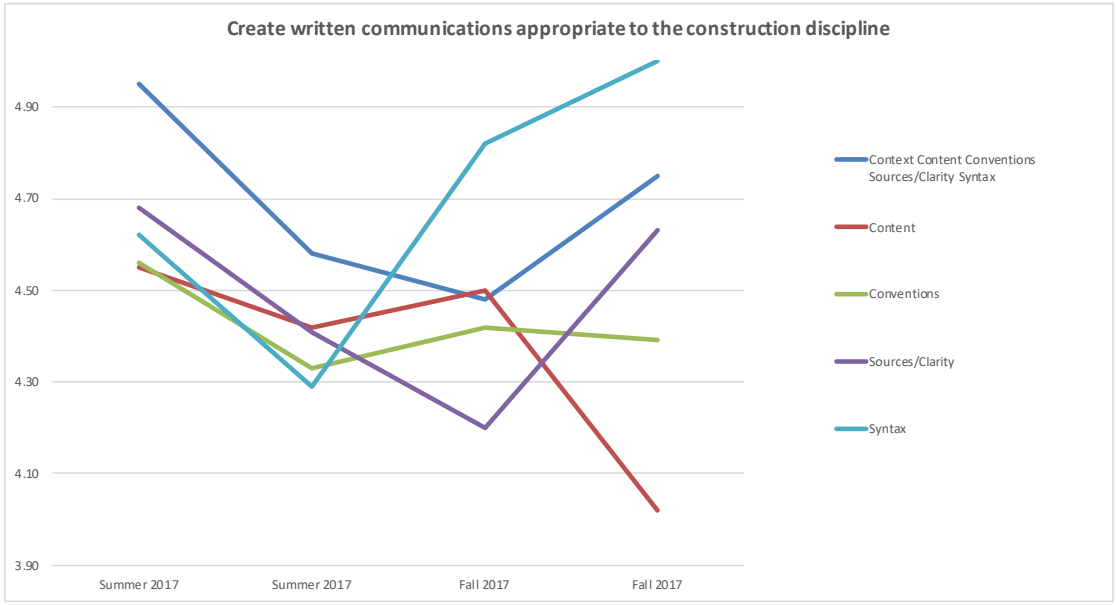
Year	Commercial	Residential	Infrastructure	Industrial	Other
Fall 2014	95%	0%	0%	6%	
Spring 2015	93%	4%	4%	0%	
Summer 2015	90%	10%	0%	0%	
Fall 2015	88%	4%	4%	4%	
Spring 2016	96%	0%	0%	4%	
Summer 2016	85%	5%	5%	5%	
Fall 2016	64%	20%	0%	0%	16%
Spring 2017	73%	4%	4%	0%	19%
Summer 2017	86%	7%	0%	0%	7%

BSCI Career Office Tracking
Initial Hiring Position

Year	Pre-construction	Project Management	Field Operations	Unknown
Fall 2014	17%	66%	17%	0%
Spring 2015	7%	84%	7%	0%
Summer 2015	10%	41%	18%	31%
Fall 2015	4%	23%	54%	31%
Spring 2016	4%	57%	35%	4%
Summer 2016	5%	46%	29%	20%
Fall 2016	7%	22%	39%	29%
Spring 2017	0%	19%	55%	26%
Summer 2017	7%	40%	53%	0%

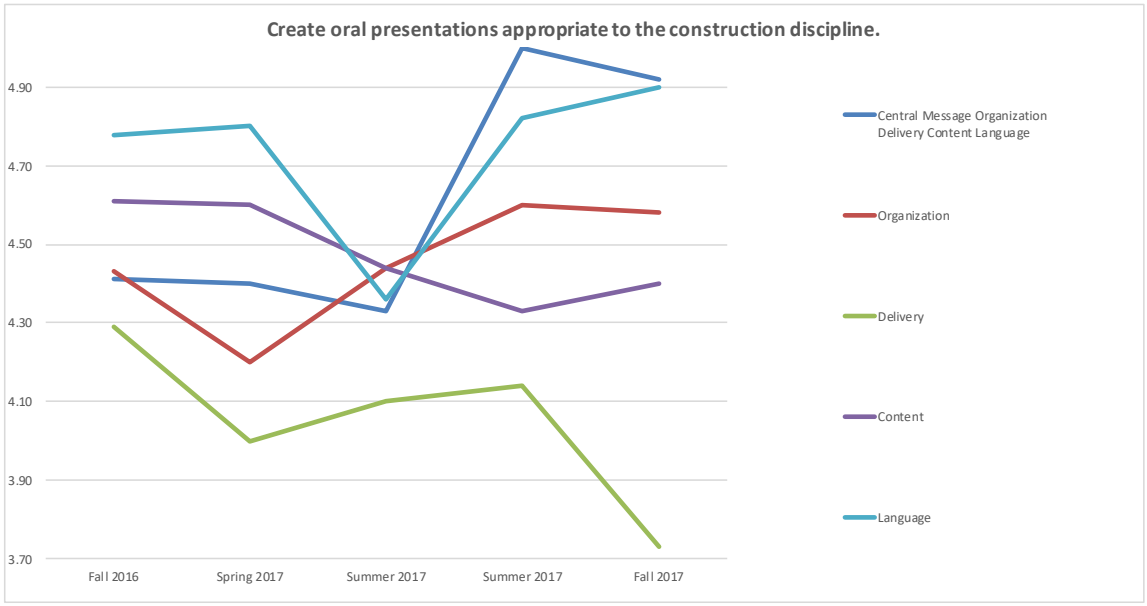
ACCE SLO#1 Create written communications appropriate to the construction discipline

	Context	Content	Conventions	Sources/Clarity	Syntax
Summer 2017	4.95	4.55	4.56	4.68	4.62
Summer 2017	4.58	4.42	4.33	4.41	4.29
Fall 2017	4.48	4.50	4.42	4.20	4.82
Fall 2017	4.75	4.02	4.39	4.63	5.00



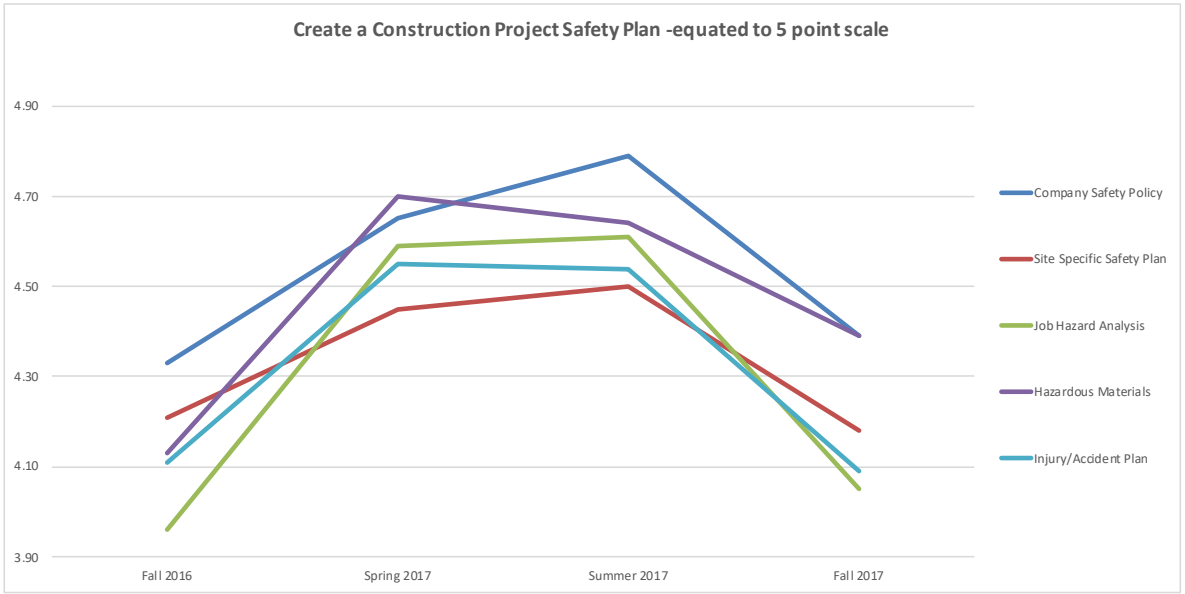
ACCE SLO#2 Create oral presentations appropriate to the construction discipline.

	Central Message	Organization	Delivery	Content	Language
Fall 2016	4.41	4.43	4.29	4.61	4.78
Spring 2017	4.40	4.20	4.00	4.60	4.80
Summer 2017	4.33	4.44	4.10	4.44	4.36
Summer 2017	5.00	4.60	4.14	4.33	4.82
Fall 2017	4.92	4.58	3.73	4.40	4.90



ACCE SLO#3 - Create a construction project safety plan -equated to 5 point scale

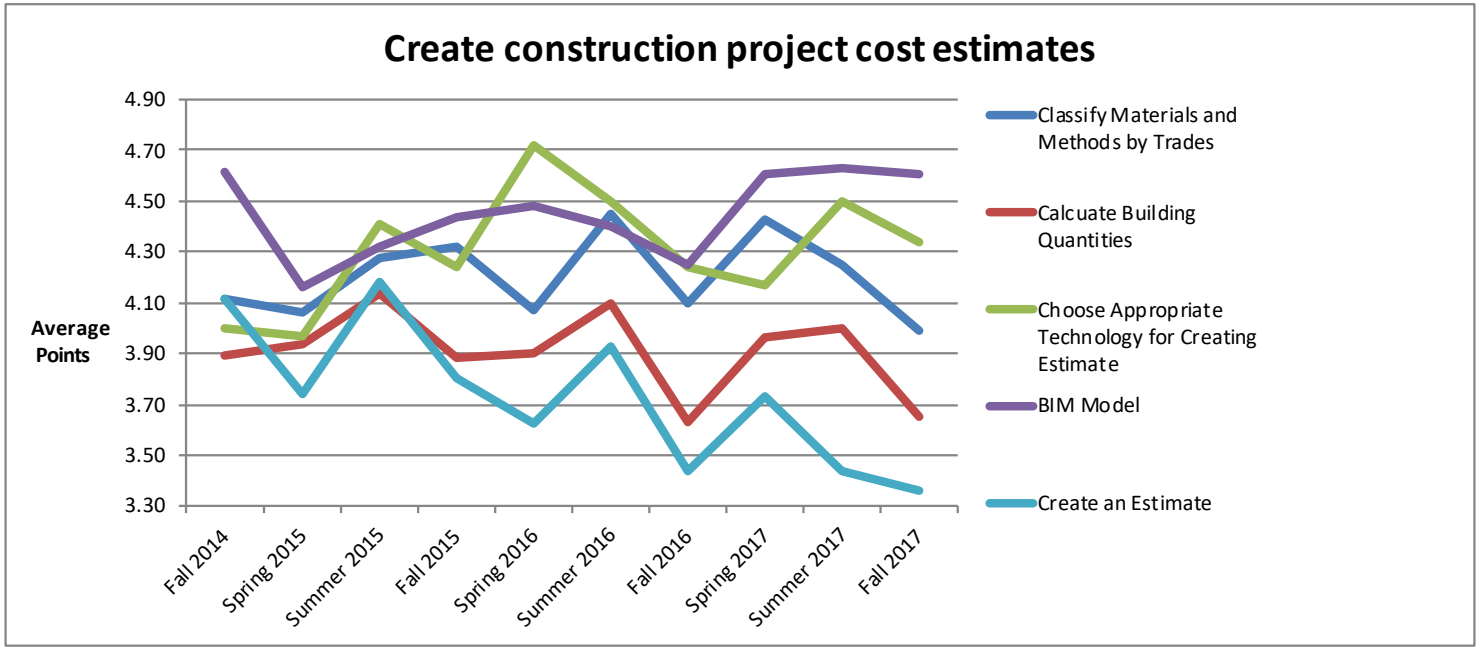
	Company Safety Policy	Site Specific Safety Plan	Job Hazard Analysis	Hazardous Materials	Injury/Accident Plan
Fall 2016	4.33	4.21	3.96	4.13	4.11
Spring 2017	4.65	4.45	4.59	4.7	4.55
Summer 2017	4.79	4.5	4.61	4.64	4.54
Fall 2017	4.39	4.18	4.05	4.39	4.09



Summary of Student Learning Outcomes Assessment

ACCE SLO#4 Create construction project cost estimates

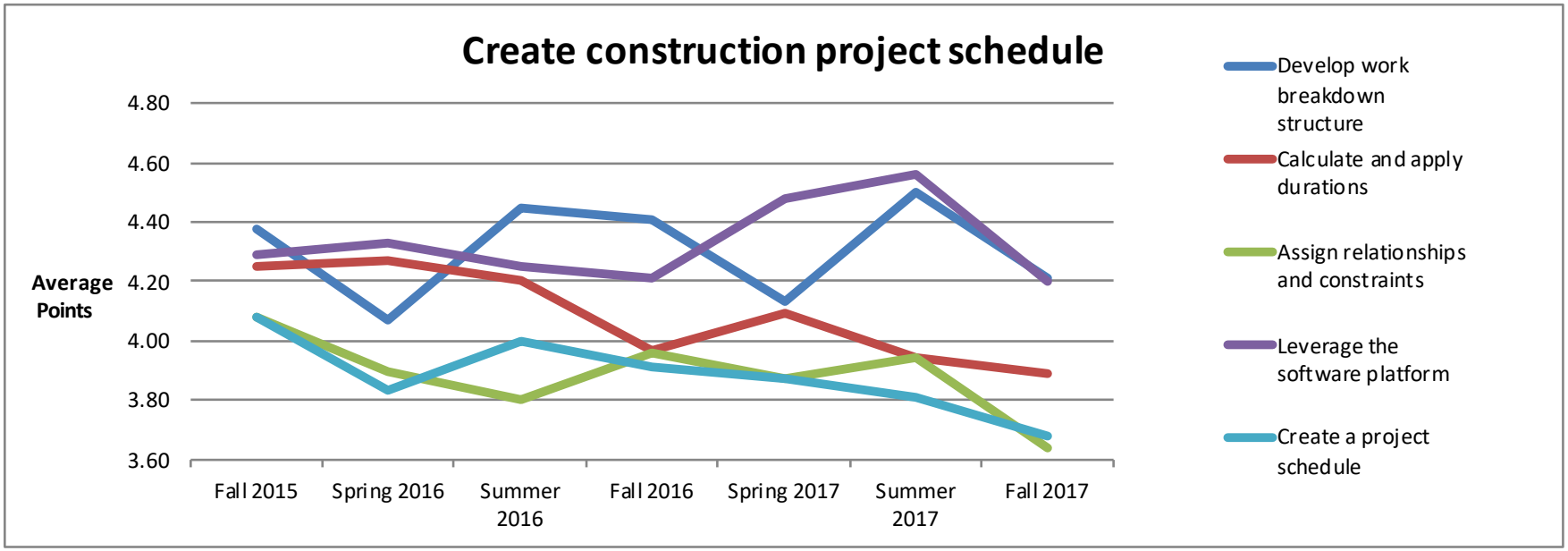
	Classify Materials and Methods by Trades	Calcuate Building Quantities	Choose Appropriate Technology for Creating Estimate	BIM Model	Create an Estimate
Fall 2014	4.11	3.89	4.00	4.61	4.11
Spring 2015	4.06	3.94	3.97	4.16	3.74
Summer 2015	4.27	4.14	4.41	4.32	4.18
Fall 2015	4.32	3.88	4.24	4.44	3.80
Spring 2016	4.07	3.90	4.72	4.48	3.62
Summer 2016	4.45	4.10	4.50	4.40	3.93
Fall 2016	4.10	3.63	4.24	4.25	3.44
Spring 2017	4.43	3.96	4.17	4.61	3.73
Summer 2017	4.25	4.00	4.50	4.63	3.44
Fall 2017	3.99	3.65	4.34	4.61	3.36



Summary of Student Learning Outcomes Assessment

ACCE SLO#5 Create construction project schedule- Average Points

	Develop work breakdown structure	Calculate and apply durations	Assign relationships and constraints	Leverage the software platform	Create a project schedule
Fall 2015	4.38	4.25	4.08	4.29	4.08
Spring 2016	4.07	4.27	3.90	4.33	3.83
Summer 2016	4.45	4.20	3.80	4.25	4.00
Fall 2016	4.41	3.97	3.96	4.21	3.91
Spring 2017	4.13	4.09	3.87	4.48	3.87
Summer 2017	4.50	3.94	3.94	4.56	3.81
Fall 2017	4.21	3.89	3.64	4.20	3.68



ACCE SLO #11 Apply basic surveying techniques for construction layout and control.

	Number of Students					
	<60%	**60-69%**	**70-79%**	**80-89%**	**90+%**	**Average**
Summer 2016 - Final Examination	0	1	8	31	57	90.30%
Summer 2016 -Field Book	0	0	3	3	91	97.46%
Summer 2017 - Final Examination	0	2	24	46	54	87.05%
Summer 2017 -Field Book	0	0	0	4	122	98.39%

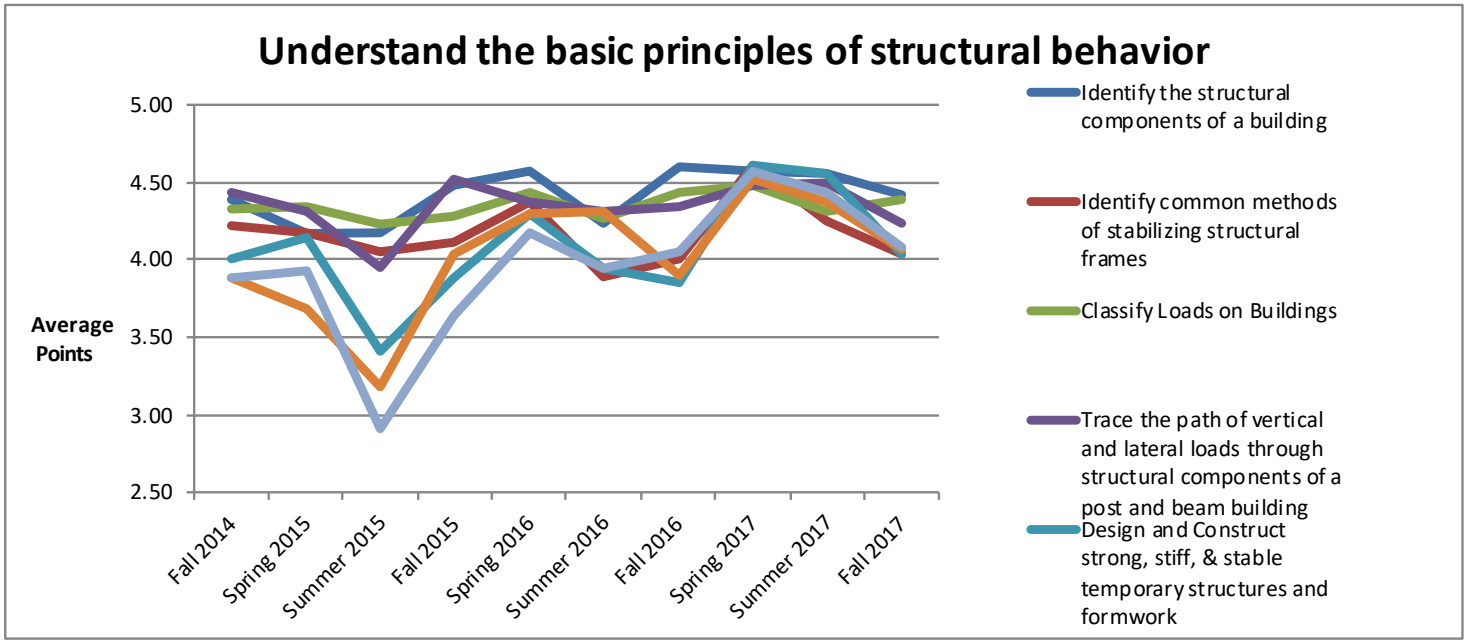
ACCE SLO #18 Understand the basic principles of sustainable construction

	Environmental impacts of construction on site	Fundamental commissioning and verification	Environmentally preferable products	Reduce construction waste	IAQ management plan
Fall 2015	4.52	4.16	4.04	4.28	3.88
Spring 2016	4.47	4.20	4.20	4.47	4.07
Summer 2016	4.75	4.40	4.35	4.05	4.30
Fall 2016	4.57	3.88	4.16	4.20	4.03
Spring 2017	4.59	4.25	4.52	4.58	4.17
Summer 2017	4.44	4.31	4.75	4.50	4.50
Fall 2017	4.39	4.14	3.70	4.10	3.95

Summary of Student Learning Outcomes Assessment

ACCE SLO #19 Understand the basic principles of structural behavior

	Identify the structural components of a building	Identify common methods of stabilizing structural frames	Classify Loads on Buildings	Trace the path of vertical and lateral loads through structural components of a post and beam building	Design and Construct strong, stiff, & stable temporary structures and formwork	Calculate internal member forces in structural elements of buildings	Determine internal stresses on structural bending elements
Fall 2014	4.39	4.22	4.33	4.44	4.00	3.89	3.89
Spring 2015	4.17	4.17	4.34	4.31	4.14	3.69	3.93
Summer 2015	4.18	4.05	4.23	3.95	3.41	3.18	2.91
Fall 2015	4.48	4.12	4.28	4.52	3.88	4.04	3.64
Spring 2016	4.57	4.37	4.43	4.37	4.30	4.30	4.17
Summer 2016	4.24	3.89	4.26	4.31	3.94	4.31	3.94
Fall 2016	4.60	4.00	4.43	4.35	3.85	3.90	4.05
Spring 2017	4.57	4.61	4.48	4.48	4.61	4.52	4.57
Summer 2017	4.56	4.25	4.31	4.49	4.56	4.38	4.44
Fall 2017	4.42	4.04	4.39	4.24	4.04	4.06	4.08



Summary of Student Learning Outcomes Assessment

ACCE SLO #20 Understand the basic principles of mechanical, electrical and piping systems.

	Number of Students					
	<60%	**60-69%**	**70-79%**	**80-89%**	**90+%**	**Average**
Fall 2016-Final Examination BSCI 4700 (Mechanical portion)	0	1	14	30	14	85%
Spring 2017-Final Examination BSCI 4700 (Mechanical portion)	0	3	11	23	12	84%
Fall 2017-Final Examination BSCI 4700 (Mechanical portion)	3	6	15	24	18	83%
Fall 2016-Mid Term Examination BSCI 4700 (Plumbing portion)	1	1	14	32	12	84%
Spring 2017-Mid Term Examination BSCI 4700 (Plumbing portion)	0	0	11	29	9	84%
Fall 2017-Mid Term Examination BSCI 4700 (Plumbing portion)	0	1	6	23	36	89%
Fall 2016-3 Examinations in BSCI 4750 (Electrical Portion)	3	1	9	40	67	88%
Spring 2017-3 Examinations in BSCI 4750 (Electrical Portion)	0	0	4	36	18	87%
Fall 2017-3 Examinations in BSCI 4750 (Electrical Portion)	0	0	5	25	20	88%