



CONSTRUCTION SCIENCE
TEXAS A&M UNIVERSITY

Academic Quality Plan

Bachelor of Science in Construction Science

Department of Construction Science

College of Architecture

Texas A&M University

Spring 2021

TABLE OF CONTENTS

1. INTRODUCTION	4
2. DEPARTMENT MISSION	4
3. SUPPORTING DOCUMENTS	4
4. TEXAS A&M UNIVERSITY INSTITUTIONAL STUDENT LEARNING OUTCOMES	5
5. DEPARTMENT OF CONSTRUCTION SCIENCE STUDENT LEARNING OUTCOMES	7
6. DISTRIBUTION OF STUDENT LEARNING OUTCOMES, DIRECT ASSESSMENT, AND INDIRECT ASSESSMENT IN COSC CURRICULUM... 12	
6.1 DISTRIBUTION OF STUDENT LEARNING OUTCOMES	12
6.2 DIRECT AND INDIRECT ASSESSMENT MATRIX.....	12
7. DIRECT ASSESSMENT EVALUATION METHODOLOGY AND TOOLS	15
7.1 COURSE AND ASSESSMENT TOOLS USED FOR DIRECT ASSESSMENT OF SLOs.....	16
7.2. STUDENT LEARNING OUTCOME (SLO) DATA COLLECTION AND NOTEBOOK	18
8. DEPARTMENT OF CONSTRUCTION SCIENCE ASSESSMENT AND REVIEW CYCLE	19
9. INDIRECT ASSESSMENT EVALUATION METHODOLOGY AND TOOLS..	22
9.1. SENIOR EXIT SURVEYS	22
9.2. FORMER STUDENT SURVEYS	23
9.3. CONSTRUCTION INDUSTRY ADVISORY COUNCIL REVIEWS AND FEEDBACK	24
9.4. JOB PLACEMENT RECORDS	24
10. FEEDBACK AND USE OF THE ACADEMIC QUALITY PLAN AND ASSESSMENT IMPLEMENTATION	25

TABLES

Table 1 Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in COSC Pre-Fall 2020 Core Curriculum	13
Table 2 Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in 2021 - 22 Degree Plan COSC Core Curriculum.....	14
Table 3 Distribution of SLOs among Primary Course Groups.....	19

FIGURES

Figure 1. Flow Chart of Texas A&M University System and Texas A&M University Student Learning Outcomes to COSC Student Learning Outcomes.....	11
Figure 2 Department of Construction Science Assessment and Review Cycle.....	20
Figure 3 Gantt Chart of COSC Assessment Cycle Processes and Deadlines.....	21

1. Introduction

The following is the Academic Quality Plan for the Bachelor of Science in Construction Science undergraduate degree program (COSC) at Texas A&M University. This plan was developed in accordance with the requirements set forth by Texas A&M University and the American Council for Construction Education (ACCE), the accrediting body of the Construction Science Undergraduate Program. After review and input from the faculty of the department, this plan was initially approved by unanimous vote of the faculty on September 16, 2016.

This is a comprehensive plan for quality improvement of the COSC program and its students through development and assessment of educational program objectives and student learning outcomes through direct assessment and indirect assessment of student achievement.

The educational program objectives are derived from the department's mission. Student learning outcomes are derived from the educational program objectives and ACCE guidelines.

The plan will be reviewed and updated periodically as justified.

2. Department Mission

The Construction Science Department is dedicated to education, discovery, development and application of knowledge in the field of construction while fulfilling the land grant mission of Texas A&M University and enhancing the economic development of the State of Texas. Our mission of providing the highest quality undergraduate and graduate programs is inseparable from our mission of developing new understanding through teaching, research and service. We prepare students to assume roles in leadership, responsibility, and service to society.

3. Supporting Documents

This Academic Quality Plan is an integral part of, and supported by, the following:

- 3.1.1. The 2020 – 2025 COSC Department Strategic Plan,
- 3.1.2. The Department's University Assessment Plan and Report, and
- 3.1.3. The annual COSC Academic Quality and Assessment Implementation Report.

4. Texas A&M System Student Learning Outcomes

The Texas A&M System developed a common set of Student Learning Outcomes (SLOs) that allow the system to hold all its member institutions accountable for student success.

The six Texas A&M System SLOs are:

<http://empoweru.tamus.edu/student-learning-outcomes/>

- **Ethical & Social Responsibility** – “Students will articulate multiple cultural perspectives in local, national and global communities. Students will identify and analyze social and ethical challenges, including possible resolutions.”
- **Globalization & Diversity** – “Students will utilize multidisciplinary perspectives to evaluate initiatives that have been employed to address global issues. Students will describe the nature of global interdependence.”
- **Specific Knowledge** – “Students will perform satisfactorily on licensure or certification exams necessary for professional status within their chosen careers, where applicable. Students will demonstrate skills required for success.”
- **Integration** – “Students will demonstrate mastery of the general education core curriculum. Students will apply broad knowledge to academic disciplines and professional or technical fields.”
- **Communication** – “Students will use multiple formats and technologies to communicate ideas effectively in large and small group settings. Students will apply fundamental writing strategies such as invention, drafting ...”
- **Problem Solving/Critical Thinking** – “Students will construct well-supported, clearly articulated and sustained arguments. Students will demonstrate an ability to justify conclusions based on evidence. Students will interpret, analyze, and evaluate.”

Texas A&M University Institutional Student Learning Outcomes

(Texas A&M University Office of Institutional Effectiveness <http://catalog.tamu.edu/undergraduate/general-information/student-learning-outcomes/#baccalaureate>)

According to the Texas A&M University Undergraduate Catalog, student learning outcomes articulate the knowledge and skills we expect students to gain during their educational experience. These learning outcomes require students connect their course- and degree-level learning to overall goals determined to be critically important as graduates progress in their career and engage in learning for a lifetime.

We expect students to have learned the material presented in their individual courses; from entry-level general education courses required of all undergraduates to capstone courses restricted to seniors in a major to specialized graduate seminars. By the time they graduate, students are expected to have learned the material assigned in all of their courses. Not only must graduates know facts and understand basic concepts, they must also demonstrate an ability to apply and explain those facts and concepts creatively in new situations. Students gain the skills and knowledge that allows them to thrive in a complex world.

A student who graduates from Texas A&M with a baccalaureate degree will have acquired the knowledge and skills necessary to:

Master the depth of knowledge required for a degree, including the ability to:

- Articulate disciplinary and interdisciplinary theories, concepts, principles, skills, and practices;
- Synthesize knowledge across courses and other experiences; and
- Apply knowledge from core curriculum courses, discipline-based courses, and other experiences in a range of contexts to solve problems and make decisions.

Demonstrate critical thinking, including the ability to:

- Evaluate, analyze, and integrate information from a variety of sources;
- Use appropriate strategies and tools to represent, analyze, and integrate information; and
- Develop critical, reasoned positions.

Communicate effectively, including the ability to:

- Demonstrate effective oral communication skills (which could include the use of languages such as American Sign language for those who do not communicate orally);
- Demonstrate effective writing skills;
- Demonstrate effective nonverbal communication skills (which could include appropriate use of performance, design, or representations such as maps, tables, and graphs);
- Listen actively and critically;
- Present work effectively to a range of audiences; and
- Effectively communicate original and creative ideas.

Practice personal and social responsibility, including the ability to:

- Practice ethical leadership;
- Recognize an ethical dilemma and apply rational decision-making in order to address it;
- Choose ethical courses of action in research and practice;
- Acknowledge and address the consequences of one's own actions; and
- Engage in local and global civic activities.

Demonstrate social, cultural, and global competence, including the ability to:

- Live and work effectively in a diverse and global society;
- Articulate the value of a diverse and global perspective; and
- Recognize diverse economic, political, cultural, and religious opinions and practices.

Prepare to engage in lifelong learning, including the ability to:

- Exhibit the skills necessary to acquire, organize, reorganize, and interpret new knowledge;

- Show proficiency in current technologies and the ability to adapt to emerging technologies;
- Recognize and participate in activities that enhance wellness of body, mind, and spirit;
- Formulate a plan of personal goals for continued professional growth; and
- Demonstrate intellectual curiosity.

Work collaboratively, including the ability to:

- Participate effectively in teams;
- Consider different points of view; and
- Work with others to support a shared purpose or goal.

Information above cited from <https://catalog.tamu.edu/undergraduate/general-information/student-learning-outcomes/#baccalaureate>

5. Department of Construction Science Student Learning Outcomes

The Department of Construction Science (COSC) adopted the 20 student learning outcomes (SLOs) identified in ACCE Document 103 to describe the skills and knowledge students are expected to know and be able to perform at the time of graduation from the COSC program at TAMU. The 20 student learning outcomes demonstrate students' ability to apply fundamental knowledge in construction science and construction management areas as described in ACCE Document 103, which lists required curriculum topical content. Further, the 20 COSC student learning outcomes directly support the university-level student learning outcomes as illustrated in Figure 1.

Faculty in the Department of Construction Science at Texas A&M University operationally defined each of the 20 ACCE learning outcomes. The operational definition of each student learning outcome provides a broad categorization of the knowledge and skills graduates with a Bachelor's of Science - Construction Science from Texas A&M University will possess for each student learning outcome. Upon graduation, all baccalaureate graduates will:

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

- Summarize information into appropriate and concise format
- Format professional communications
- Use language and content appropriate to audience

SLO #2: Create oral presentations appropriate to the construction discipline

- Demonstrate verbal and non-verbal communication skills
- Tailor language and message to the audience being addressed
- Deliver correct information

SLO #3: Create a construction project safety plan

- Prepare safety data and fact sheets
- Prepare task training checklists
- Develop Jobsite Safety Analysis (JSA) Report

SLO #4: Create construction project cost estimates

- Read plans and understand specifications
- Perform quantification/takeoff (QTO), pricing, and productivity estimates
- Develop conceptual, current, projected, and revised project budgets

SLO #5: Create construction project schedules

- Develop, update, revise, and edit schedules
- Understand cost and time variances and their impacts on the project schedule

SLO #6: Analyze professional decisions based on ethical principles

- Identify ethical issues using applicable elements of a code of ethics and/or a company code of ethics
- Identify the parties involved, relationships, impacts and responsibilities of each

SLO #7: Analyze construction documents for planning and management of construction processes

- Examine the submittal process
- Read plans and understand specifications
- Understand contract requirements and deliverables

SLO #8: Analyze methods, material, and equipment used to construct projects

- Understand common materials, methods, and equipment in construction
- Select appropriate means and methods for a construction project

SLO #9: Apply construction management skills as a member of a multi-disciplinary team

- Participate with various project members to accomplish a construction project
- Understand the training, experience, and qualifications of various parties involved in the construction project
- Understand team member roles and responsibilities for successful project outcomes
- Create a project-specific management plan

SLO #10: Apply electronic-based technology to manage the construction process

- Demonstrate appropriate use of technologies to complete construction operations and management tasks

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

- Understand distance, grade, and angular measurement
- Demonstrate use of surveying equipment for construction layout and control
- Use three-dimensional measurement, modeling, and positioning systems

SLO #12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process

- Understand the aspects of, and risks associated with, different project delivery methods
- Compare different project delivery methods and select the most effective method

SLO #13: Understand construction risk management

- Identify and understand different types of risk
- Understand techniques for risk shifting and mitigation
- Quantify risk

SLO #14: Understand construction accounting and cost control

- Understand the relationships between time and resources on project costs
- Understand labor and operations cost reports

SLO #15: Understand construction quality assurance and control

- Understand the submittal process for construction materials and deliverables
- Understand specifications as they apply to project QA/QC
- Understand the role of construction material testing standards

SLO #16: Understand construction project control processes

- Understand project control procedures and inputs
- Understand basic project control systems and their effects on tracking project costs and budgets

SLO #17: Understand the legal implications of contract, common, and regulatory law to manage a construction project

- Identify the essential components and critical clauses in a construction contract
- Understand appropriate vocabulary in legal communication
- Understand the remedies available to parties impacted by breaches of legal duties
- Understand alternative dispute resolution methods

SLO #18: Understand the basic principles of sustainable construction

- Understand the definition and application of sustainability
- Understand the characteristics of sustainable materials and methods

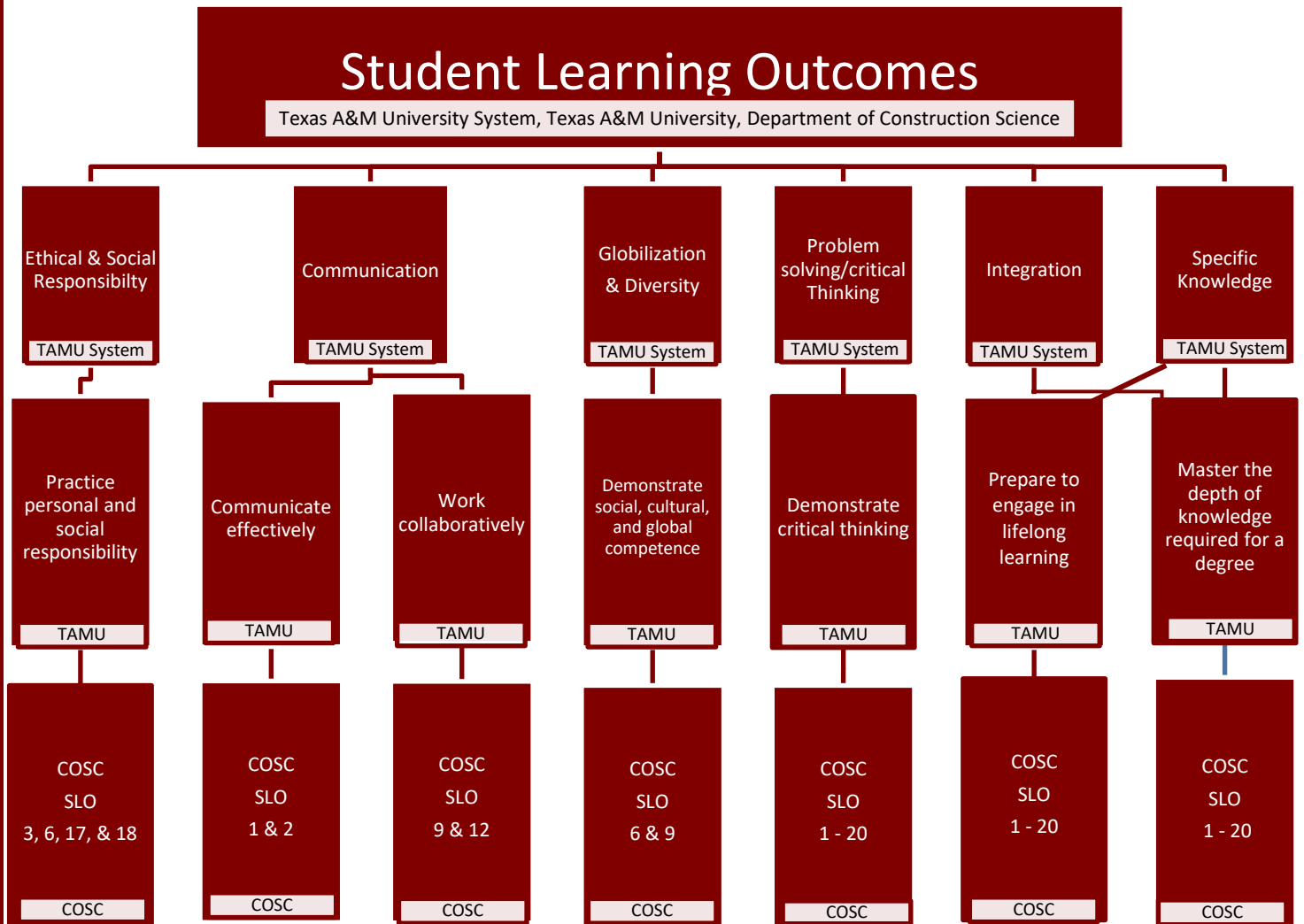
SLO #19: Understand the basic principles of structural behavior

- Understand basic structural systems
- Understand the fundamental properties of soils
- Understand the basic forces that act upon buildings

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

- Understand the contractor's role in the delivery of MEP systems
- Understand the operation and installation of MEP systems

Figure 1. Flow Chart of Texas A&M University System and Texas A&M University Student Learning Outcomes to COSC Student Learning Outcomes



6. Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in COSC Curriculum

6.1 Distribution of Student Learning Outcomes

The identified student learning outcomes (1-20) are distributed throughout the program in order to reinforce and increase student mastery of basic Construction Science concepts and skills. Concepts are generally introduced in lower-level (basic) courses and reinforced through practice in more advanced upper-level courses. In some courses where concepts are practiced, students are assessed both for achievement of course objectives and proficiency in selected student learning outcomes.

The curriculum has been designed to ensure student learning outcomes are fulfilled. Table 1 illustrates the contribution of individual courses in the COSC curriculum to the achievement of student learning outcomes. An “I” indicates introduction of the student learning outcome through the course content to create an awareness or basic understanding of the idea or concept. An “R” indicates courses in which skills and concepts contributing to the student learning outcome are reinforced. Reinforcement of the student learning outcome (SLO) may be in the form of creating a deeper understanding of relevant knowledge and skills and/or providing practice in the practical application of the skills or concepts.

6.2 Direct and Indirect Assessment Matrix

The comprehensive assessment plan of direct and indirect assessment for each of the twenty student learning outcomes is graphically represented in the *Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in COSC Pre-Fall 2020 Core Curriculum* and *Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in 2021 – 22 Degree Plan COSC Core Curriculum* matrixes (Tables 1 and 2, respectively) below. In the tables, a “DA” designation indicates the course in which the student learning outcome will be assessed using a direct assessment method. An “IA” designation indicates a course in which the student learning outcome will be assessed using an indirect assessment method.

Table 1 Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in COSC Pre-Fall 2020 Core Curriculum

DISTRIBUTION OF STUDENT LEARNING OUTCOMES AND ASSESSMENT IN COSC PRE-FALL 2020 CORE CURRICULUM																						
		I = SLO Introduced R = SLO Reinforced		DA = PRIMARY DIRECT ASSESSMENT IA = INDIRECT ASSESSMENT																		
Course	Course Group	Credit Hours	Student Learning Outcome*																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
COSC-175	Project Controls	3-0 (3)	I	I		I			I					I		I						I
COSC-253	Materials & Methods	3-0 (3)								I DA							I DA			I	I	
COSC-254	Materials & Methods	3-0 (3)			I				I	R							I		I	I	I	
COSC-275	Project Controls	2-3 (3)				I		I	I	I		I	I									
COSC-301	Materials & Methods	0-4 (2)										I	I DA									
COSC-321	Materials & Methods	2-2 (3)								R		R									I DA	
COSC-325	Materials & Methods	3-0 (3)			R				R											R DA		I DA
COSC-326	Materials & Methods	3-0 (3)																		R		R
COSC-353	Project Admin.	3-0 (3)	I	I		I	I	I	R DA		I	R	R	R DA	I		R		I			
COSC-364	Project Admin.	1-0 (1)	I		R DA				R						I				R			
COSC-375	Project Controls	2-3 (3)				R DA		R	R			R										
COSC-381	Project Admin.	1-0 (1)	R					R														
COSC-421	Materials & Methods	3-0 (3)															R				R	
COSC 440-6	Capstone	2-3 (3)	R	R DA		R	R				R DA											
COSC-463	Project Admin.	3-0 (3)						R DA						R	R DA					R		
COSC-465	Project Admin.	3-0 (3)	R					R							R					R DA		
COSC-475	Project Controls	2-3 (3)				R	I DA		R			R DA				R		R				
COSC-477	Project Controls	3-0 (3)				R	R		R					R	R	R DA	R	R DA	R			
COSC-484	Project Admin.	6	R								R											
COSC-494	Project Admin.	6	R DA								R											
Student Exit Survey	Collected at graduation (3/year)		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
DISTRIBUTION OF STUDENT LEARNING OUTCOMES IN COSC TECHNICAL ELECTIVES																						
Course	Course Group	Credit Hours	Student Learning Outcome*																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
COSC-450	Project Admin.	3-0 (3)																			R	
COSC-459	Materials & Methods	3-0 (3)		R						R								R				
COSC-461	Materials & Methods	3-0 (3)		R					R		R	R										
COSC-464	Project Admin.	3-0 (3)	R		R				R						R							
COSC-474	Project Admin.	3-0 (3)									R										R	

* A full description of each SLO numbered 1 – 20 in this table may be found in Section 5.

Table 2 Distribution of Student Learning Outcomes, Direct Assessment, and Indirect Assessment in 2021 – 22 Degree Plan COSC Core Curriculum

DISTRIBUTION OF STUDENT LEARNING OUTCOMES AND ASSESSMENT IN 2021 – 22 DEGREE PLAN COSC CORE CURRICULUM																									
			I = SLO Introduced R = SLO Reinforced		DA = PRIMARY DIRECT ASSESSMENT IA = INDIRECT ASSESSMENT																				
Course	Course Group	Credit Hours	Student Learning Outcome*																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
COSC 153	Materials & Methods	3-0 (3)								I	I														
COSC 175	Project Controls	3-0 (3)	I			I				I					I							I			
COSC 184	Project Admin.	1-0 (1)	I		R DA					R					I				R						
COSC 222	Project Admin.	3-0 (3)	I	I					I			I													
COSC 253	Materials & Methods	3-0 (3)									I DA							I DA			I	I			
COSC 275	Project Controls	2-3 (3)				I			I	I	I			I	I										
COSC 284	Project Admin.	1-0 (1)	R						R																
COSC 301	Materials & Methods	0-4 (2)											I	I DA											
COSC 321	Materials & Methods	2-2 (3)									R		R									I DA			
COSC 325	Materials & Methods	3-0 (3)			R					R											I DA	I DA			
COSC 353	Project Admin.	3-0 (3)	I	I		I	I	I	R DA		I	R	R	R DA	I		R			I					
COSC 375	Project Controls	2-3 (3)				R DA			R	R				R											
COSC 440-6	Capstone	2-3 (3)	R	R DA	R	R	R		R			R DA			R										
COSC 463	Project Admin.	3-0 (3)	R						R DA						R	R DA				R					
COSC 465	Project Admin.	3-0 (3)	R						R						R					R DA					
COSC 475	Project Controls	2-3 (3)				R	I DA		R			R DA				R		R							
COSC 477	Project Controls	3-0 (3)				R	R		R						R	R	R DA	R	R DA	R					
COSC 484	Project Admin.	6	R											R											
COSC 494	Project Admin.	6	R DA											R											
Student Exit Survey	Collected at graduation (3/year)		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA			
DISTRIBUTION OF STUDENT LEARNING OUTCOMES IN COSC TECHNICAL ELECTIVES																									
Course	Course Group	Credit Hours	Student Learning Outcome*																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
COSC 303	Materials & Methods	3-0 (3)				R	R	R	R																
COSC 326	Materials & Methods	3-0 (3)																		R		R			
COSC 421	Materials & Methods	3-0 (3)															R				R				
COSC 450	Project Admin.	3-0 (3)																		R					
COSC 459	Materials & Methods	3-0 (3)		R							R							R							
COSC 461	Materials & Methods	3-0 (3)		R						R		R	R												
COSC 464	Project Admin.	3-0 (3)	R		R					R						R									
COSC 468	Project Admin.	3-0 (3)							R							R				R					
COSC 474	Project Admin.	3-0 (3)											R								R				

* A full description of each SLO numbered 1 – 20 in this table may be found in Section 5.

7. Direct Assessment Evaluation Methodology and Tools

Courses selected for direct assessment of an SLO provide significant treatment of the student learning outcome, do so in a manner that can be assessed, and complement each other when more than one course is identified for a single student learning outcome. In order to assess student awareness, understanding, skill, or ability pertaining to each of the twenty student learning outcomes upon completion of an undergraduate construction science degree, assessment is generally undertaken in upper-level courses.

Multiple assessment methods will be used to directly assess student learning outcomes. A minimum of one direct assessment method will be used to quantitatively determine the level of student performance for each of the twenty student learning outcomes listed above within the appropriate Bloom's cognitive domain. Direct assessment will occur through embedded assessments in degree-program required COSC upper-level courses which will include capstone courses.

A student learning outcome may be assessed in more than one course using assessment tools such as examinations, assignments, reports, and/or projects. Courses have been divided into four groups as follows with an assigned Course Group Coordinator. The four course groups are:

- Materials, Methods, Design, and Analysis
- Project Controls
- Project Administration
- Capstone

Direct assessment of courses in each course group will demonstrate the COSC program is meeting student learning outcome requirements. Because each SLO describes a knowledge-base which may be comprised of more than one component, direct assessment may occur using a combination of assignments, projects, and/or exams as appropriate either in whole or in part from either a single course or a combination of courses.

Data collection occurs twice during the academic year (once each Fall and Spring semester). Course instructors provide, at minimum, the class average, total number of students, copy of data collection instrument, rubric or answer key, and representative sample of student work for the targeted questions, exams, and/or assignments for each direct assessment utilized for an individual SLO.

Performance criteria will be set at an average score of 70% of the combined direct assessments for each of the 20 SLOs. The average score will comprise either an assessment or combination of assessments of student performance on assignments, projects, exams, and/or presentations on either a question-by-question basis and/or on a topic-by-topic basis, as appropriate, from identified courses.

7.1 Course and Assessment Tools Used for Direct Assessment of SLOs

The combination of courses and assessment tools used to assess each of the twenty student learning outcomes is described below:

- SLO #1: *Create communications appropriate to the construction discipline:* Direct assessment will occur using a combination of assignments (in whole or in part) from COSC course 494 (Internship).
- SLO #2: *Create oral presentations appropriate to the construction discipline:* Direct assessment will occur using a combination of assignment and project (in whole or in part) from COSC course 440, 441, 442, 443, and/or 446 (Capstone).
- SLO #3: *Create a construction project safety plan:* Direct assessment will occur using a combination of assignments and Pre/Post- Quiz (in whole or in part) from COSC courses 184/364 (Construction Safety I).
- SLO #4: *Create construction project cost estimates:* Direct assessment will occur using a combination of assignment and Quiz (in whole or in part) from COSC 375 (Estimating II).
- SLO #5: *Create construction project schedules:* Direct assessment will occur using a combination of assignment and project (in whole or in part) from COSC course 475 (Construction Project Planning).
- SLO #6: *Analyze professional decisions based on ethical principles:* Direct assessment will occur using a combination of assignments (in whole or in part) from 463 (Introduction to Construction Law).
- SLO #7: *Analyze construction documents for planning and management of construction processes:* Direct assessment will occur using a combination of assignments (in whole or in part) from COSC course 353 (Construction Project Management).
- SLO #8: *Analyze methods, material, and equipment used to construct projects:* Direct assessment will occur using a combination of assignments and/or exams (in whole or in part) from COSC course 253 (Construction Materials and Methods I).
- SLO #9: *Apply construction management skills as a member of a multi-disciplinary team:* Direct assessment will occur using a combination of assignments and/or project (in whole or in part) from COSC courses 440, 441, 442, 443, and/or 446 (Capstone).

- SLO #10: *Apply electronic-based technology to manage the construction process:* Direct assessment will occur using a combination of assignments (in whole or in part) from COSC course 475 (Construction Project Planning).
- SLO #11: *Apply basic surveying techniques for construction layout and control:* Direct assessment will occur using a combination of assignments (in whole or in part) from the COSC course 301 (Construction Surveying).
- SLO #12: *Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process:* Direct assessment will occur using a combination of exams (in whole or in part) from COSC courses 353 (Construction Project Management).
- SLO #13: *Understand construction risk management:* Direct assessment will occur using a combination of exams (in whole or in part) from COSC course 463 (Introduction to Construction Law).
- SLO #14: *Understand Construction accounting and cost control:* Direct assessment will occur using a combination of assignments (in whole or in part) from COSC course 477 (Construction Project Controls).
- SLO #15: *Understand construction quality assurance and control:* Direct assessment will occur using a combination of assignments and/or exams (in whole or in part) from COSC course 253 (Materials and Methods I).
- SLO #16: *Understand construction project control processes:* Direct assessment will occur using a combination of exams (in whole or in part) from COSC course 477 (Construction Project Controls).
- SLO #17: *Understand the legal implications of contract, common, and regulatory law to manage a construction project:* Direct assessment will occur using a combination of pre/post- exams (in whole or in part) from COSC course 465 (Advanced Topics in Construction Law).
- SLO #18: *Understand the basic principles of sustainable construction:* Direct assessment will occur using a combination of assignment and/or exam (in whole or in part) from COSC course 325 (MEP Systems in Construction I).
- SLO #19: *Understand the basic principles of structural behavior:* Direct assessment will occur using a combination of assignment and/or exam (in whole or in part) from COSC course 321 (Structural Systems I).

SLO #20: *Understand the basic principles of mechanical, electrical, and piping systems*: Direct assessment will occur using a combination of exams (in whole or in part) from COSC course 325 (MEP Systems in Construction I).

7.2. Student Learning Outcome (SLO) Data Collection and Notebook

At the conclusion of each semester, course assessment data will be collected by each instructor and forwarded to the Assessment Coordinator. To document course-level assessment tools used to assess student learning for each SLO, the data for each student learning outcome will be maintained in an electronic file. The SLO Notebooks for each of the 20 student learning outcomes will be maintained by the Assessment Coordinator.

The SLO Notebook will contain:

- 7.2.1. An SLO Summary and Improvement Form
 - 7.2.1.1. A brief summary of the knowledge or skills assessed for each SLO.
 - 7.2.1.2. An assessment of student performance on a question-by-question basis or, alternatively, on a topic-by-topic basis that will include comparisons between student achievement and established metrics for the questions or topics covered in the assessment tools (typically a target pass rate of 70% on each question unless otherwise noted).
 - 7.2.1.3. Identification of SLO deficiencies and potential curriculum gaps based on direct assessment of student-level assessment tools.
- 7.2.2. Relevant assessment material from the appropriate course.
 - 7.2.2.1. Assessment material may take the form of:
 - A. Exams
 - B. Quizzes
 - C. Assignments
 - D. Projects
 - E. Presentations
 - F. Etc.
- 7.2.3. For each assessment tool submitted, instructors will provide:
 - 7.2.3.1. An example of a student artifact sans individual student identifiers
 - 7.2.3.2. Student scores (grades) for the assessment tool sans individual student identifiers
 - 7.2.3.3. The course syllabus
 - 7.2.3.4. The assignment used for assessment
 - 7.2.3.5. The assignment rubric

The SLO form and notebook will document the extent each student learning outcome described in Section 5 has been met.

8. Department of Construction Science Assessment and Review Cycle

Student learning outcomes are assigned to a primary course group in the Construction Science curriculum. Each course group has an assigned Course Group Coordinator. Three of the four course groups (Materials, Methods, Design, & Analysis; Project Administration; and Project Controls) are assigned relevant SLOs to review during the assessment cycle.

Capstone courses are the culmination of students' degree program in which students are required to apply skills and knowledge applicable to all 20 SLOs obtained through their coursework prior to graduation. Due to the over-arching nature of Capstone courses, during each year of the three-year assessment cycle at least one Capstone Course Group representative will serve on the Course Group Committee reviewing targeted SLOs.

The active participation of the Capstone Course Group representative(s) in each course group review cycle will provide valuable input when reviewing SLO assessment data through the lens of the entire COSC curriculum to determine if areas exist where curricular adjustments or greater emphasis would be beneficial. Examples of valuable degree-program level information provided by Capstone Course Group representatives may include students' ability to apply knowledge and skills in a practical context; areas where students are exceeding expectations in their ability to apply and transfer knowledge and skills to real-world applications; areas in which students are not as proficient transferring knowledge and skills to real-world application; and so forth.

The assessment cycle is a three-year cycle. Each SLO will be assessed once during the three-year cycle. Each year of the assessment cycle will focus on a primary course group with the Capstone Course Group providing a representative as previously described.

The assessment cycle for each SLO is:

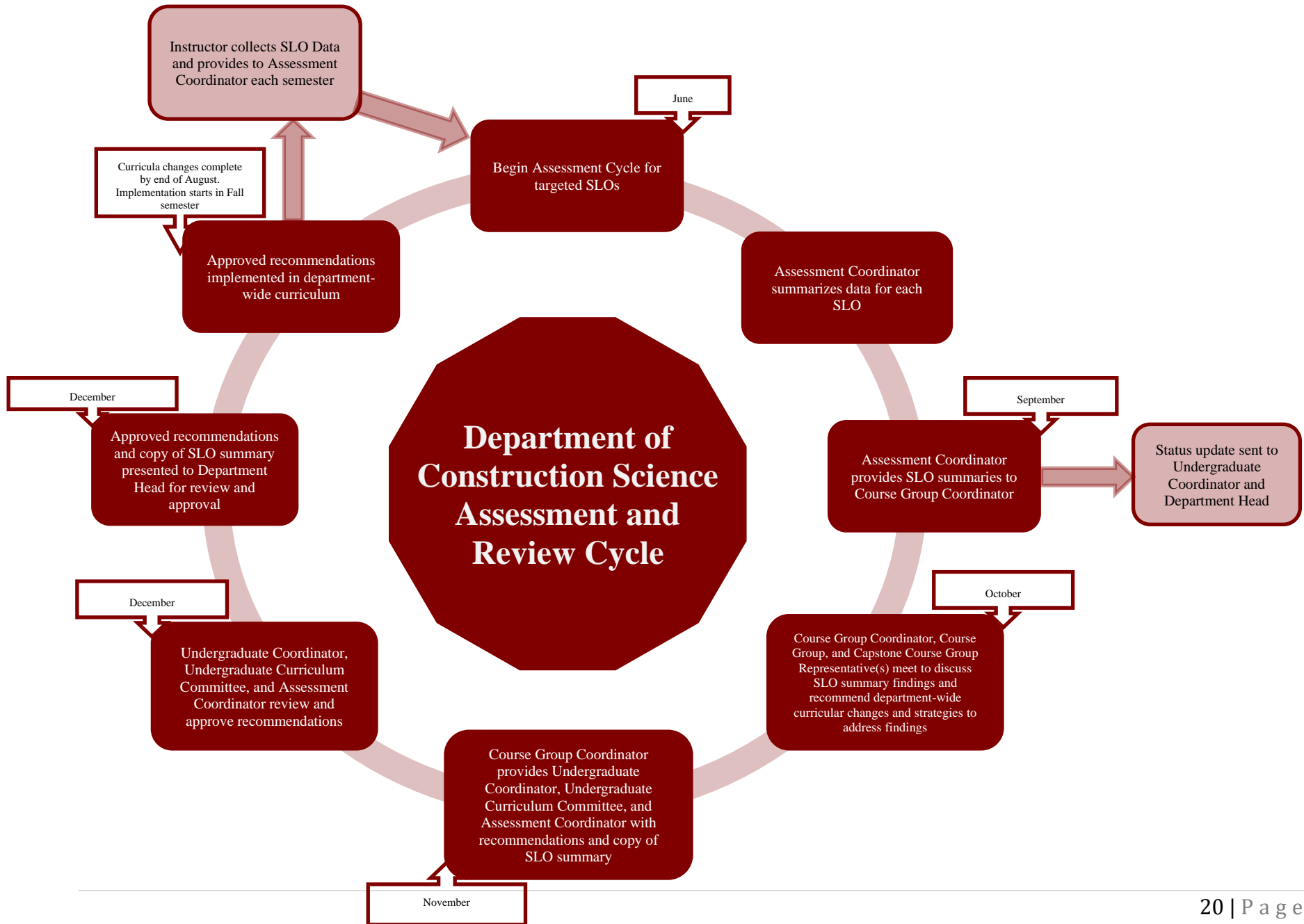
Table 3 Distribution of SLOs among Primary Course Groups

Cycle	Primary Course Group	SLOs* Assessed
Year 1	Materials, Methods Design, & Analysis	SLO: 8, 11, 18, 19, & 20
Year 2	Project Administration	SLO: 1, 2, 3, 6, 7, 9, 12, 13, 15, & 17
Year 3	Project Controls	SLO: 4, 5, 10, 14, & 16

* A full description of each SLO numbered 1 – 20 in this table may be found in Section 5.

The assessment and review process and timelines for each year in the assessment cycle are illustrated in Figures 2 and 3 below.

Figure 2 Department of Construction Science Assessment and Review Cycle



9. Indirect Assessment Evaluation Methodology and Tools

Indirect assessment of student learning outcomes and the degree program in general will be collected through senior exit surveys; alumni surveys; Construction Industry Advisory Council (CIAC) reviews and feedback; and job placement records.

9.1. Senior Exit Surveys

As an indirect assessment of the 20 student learning outcomes described in Section 5, an exit survey will be administered to all COSC students immediately prior to their graduation, soliciting their opinions with respect to their educational experiences at TAMU.

Senior Exit Surveys are administered three times a year (Fall, Spring, and Summer) during students' senior year in the Capstone courses via an online data collection instrument. Student responses are confidential and are only reported as aggregate data. For each of the 20 Student Learning Outcomes (SLOs) students will be asked to indicate how confident they are in their ability to apply the SLO and how important they believe the SLO will be in their future careers.

- 9.1.1. A 90% response rate is expected. Student responses will be used as an integral part of the assessment plan to formulate programmatic corrective action or improvements to increase student mastery of the 20 student learning outcomes.

Students will be asked to indicate how important they believe each of the 20 student learning outcomes will be in their future careers. Responses will utilize a four point Likert-type scale (4 = Very Important; 3 = Important; 2 = Somewhat Important; 1 = Not Important).

- 9.1.2. For each student learning outcome, the targeted performance criteria will be set at a minimum average score of 2.51, indicating students believe, at minimum, the student learning outcome is "Important" in their future careers.

Students will be asked to indicate how confident they are in their ability to apply each of the 20 student learning outcomes. Responses will utilize a four point Likert-type scale (4 = Very Confident; 3 = Confident; 2 = Somewhat Confident; 1 = Not Confident).

- 9.1.3 For each student learning outcome, the targeted performance criteria will be set at a minimum average score of 2.51, indicating students are, at minimum, "confident" applying individual student learning outcomes.

Students will be asked if they are satisfied with their education and choice of Construction Science as a major.

9.1.4 At least 90% of students responding will indicate satisfaction.

Students will be asked if they would major in Construction Science again.

9.1.5 At least 90% of students responding will answer yes.

Students will be asked about their internship experience.

9.1.6 At least 90% of students responding will indicate satisfaction.

Data from the Senior Exit Survey will be summarized in the annual COSC Assessment Report.

9.2. Former Student Surveys

Former student surveys will be sent once per ACCE assessment cycle (once every six years) to all TAMU graduates. The survey contains questions regarding the educational program objectives and student learning outcomes. Results of alumni responses will be used to guide programmatic changes through corrective action or improvements.

Data will be collected so responses may be grouped by “years since obtaining degree” in order to identify perspectives from respondents at different stages in their professional careers (i.e. those transitioning from entry-level positions, to more responsible positions, to senior positions).

The former student survey will ask questions that will include, but not be limited to:

- The frequency and level (based on Bloom’s Taxonomy) they have used the knowledge and skills contained in each of the 20 SLOs during the course of their careers;
- The two courses most relevant to their careers;
- What they feel was missing from their education that would have helped their careers;
- The three most important of the SLO knowledge and skills for new graduates to possess;
- Current salary data;
- Current position;
- Year graduated with degree (Bachelor’s and Master’s); and
- Years of professional experience.

Alumni data shall be summarized in the annual COSC Assessment Report.

9.3. Construction Industry Advisory Council Reviews and Feedback

The Department will hold meetings at least twice per year with members of the Construction Industry Advisory Council (CIAC). One of the main tasks of the CIAC is to assess the COSC program with respect to the educational program objectives and student learning outcomes.

Selected courses will undergo an in-depth review of course objectives, student learning outcomes, topics, and content by industry on a six-year cycle. This cycle will follow the six-year ACCE assessment cycle of student learning outcomes. Courses will be reviewed by the CIAC for selected student learning outcomes at the end of every second three-year departmental assessment cycle before curriculum changes are implemented by faculty.

9.3.1 CIAC members will report to the Department Head that they are satisfied overall.

Once each year CIAC members will meet with student focus groups to obtain feedback from the students' perspective of the undergraduate program.

9.3.2 CIAC members will report to the Department Head that they are satisfied overall.

The Industry Relations Coordinator will prepare meeting minutes that will document the content of the discussions and will highlight specific recommendations that will be addressed and implemented to improve the COSC program. In particular, the minutes shall reflect any input the CIAC members may give to the COSC Program regarding curriculum changes, objectives and outcomes.

9.4. Job Placement Records

Job placement records are a measure of the educational value received by COSC students as perceived by employers. Although not specifically linked to any listed objective or outcome, the placement records are a measure of how the COSC program is doing with respect to the overall mission. A summary of the placement records will be tracked on an annual basis to formulate plans for taking corrective action or for making improvements.

The Industry Relations Coordinator shall obtain placement data for COSC graduates will be obtained each year. These data shall be summarized in the annual COSC Assessment Report.

The department will maintain a placement rate for the graduating seniors seeking employment that is competitive with the placement rates of the best programs in construction.

The starting base salary of graduating seniors shall be competitive with salaries in related disciplines and the best programs in construction.

10. Feedback and Use of the Academic Quality Plan and Assessment Implementation

The Department Head (or designee) will summarize these results in an annual Academic Quality Assessment Implementation Report each year in accordance with TAMU's Assessment Process and ACCE's Assessment Process. The content of this Academic Quality Assessment Implementation Report consists of the following:

- 10.1.** The current version of the Department Strategic Plan.
- 10.2.** The current version of the COSC Academic Quality Plan.
- 10.3.** The annual COSC Academic Quality Assessment Implementation Report.

The main responsibilities for interpretation of results and recommendations for changes lie with the Department Head and his/her designees (the Assessment Coordinator, Undergraduate Coordinator, and the Course Group Coordinators).

Regular meetings of the Undergraduate Curriculum Committee are held each semester to review assessment data, program educational objectives and student learning outcomes.

Recommendations for improvement based on the findings of the Assessment Report shall be prepared by the Undergraduate Curriculum Committee and submitted to the faculty for consideration.

Once approved by the faculty, recommendations shall be implemented the following semester.