**Construction Management**

**Associate of Applied Science**

**Educational Effectiveness**

**Assessment Plan**

**Adopted by:**

**The Division of Construction, Design and Safety (CDS)**

**Construction Management Program**

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# Construction Management Mission Statement

The mission of the Construction Management program is to prepare future industry employees with the education, skills, and training for entry-level professional positions in construction management.

**Goals**

* Provide an educational program of distinction that prepares individuals for professional careers in the construction industry.
* Provide a challenging learning environment that seeks to maximize the strengths and capabilities of each individual student.
* Strive for consistent improvement and modernization of the academic and technical quality of the degree program.
* Build a strong and mutually beneficial relationship between the program, the alumni, and the local, regional and national construction industry.

# Introduction

This Associate of Applied Science in Construction Management (AASCM) Educational Effectiveness Assessment Plan identifies the thirteen student learning outcomes (SLO) required to be assessed by the American Council for Construction Education (ACCE) and provides a plan for the assessment of each SLO.

All core construction courses in the AASCM program are used to provide assessment data. All data shall be collected, reviewed, and used to identify recommendations for constant improvement in the AASCM program in accordance with the AASCM Assessment Implementation Plan.

# AAS PROGRAM STUDENT LEARNING OUTCOMES

1. Demonstrate effective communication, both orally and in writing.
2. Create construction project cost estimates. (Uses BSCM SLO)
3. Create construction project schedules. (Uses BSCM SLO)
4. Demonstrate the ability to use current technology related to the construction process.
5. Interpret construction documents (contracts, specifications, and drawings) used in managing a construction project.
6. Apply basic principles of construction accounting.
7. Use basic surveying techniques used in building layout.
8. Discuss basic principles of ethics in the construction industry.
9. Identify the fundamentals of contracts, codes, and regulations that govern a construction project.
10. Recognize basic construction methods, materials and equipment.
11. Recognize basic safety hazards on a construction site and standard prevention measures.
12. Recognize the basic principles of structural design.
13. Recognize the basic principles of mechanical, electrical and piping systems.

# Related Instruction

The Construction Management program consists of two degree programs, the Associate of Applied Science (AAS) and Bachelor of Science (BS), organized along a 2 + 2 path; the BS curriculum builds on the first two years of the AAS degree.

General Education Requirements (GERs) in Oral Communication Skills, introduced in COMM classes, are further developed throughout the Construction Management (CM) program. In-class presentations are required for most CM courses, preparing students to effectively interact verbally with clients and the broad array of industry professionals involved in the construction process. In-class presentations start in Architectural and Engineering Technology (AET) A101 with presentation of symbols used in construction documents and continues through the capstone course, CM A450, *Construction Management Professional Practice* where students work as teams, orally presenting bid proposals based on construction documents used in real construction projects.

Similarly, written communication skills, introduced in WRTG A111 and A212, are applied early and consistently throughout the CM program. Starting in Architectural and Engineering Technology (AET) A102, *Methods of Building Construction,* building assemblies and materials are researched in written documents. Even in a relatively technical class like AET A142, *Mechanical and Electrical Technology*, a written research paper into current emerging technologies is required. Both the CM A295, *Construction Management Internship* and the CM A495, *Advanced* *Construction Management Internship,* require students to keep a daily journal of on-site activity which must then be summarized in a written reflection paper that addresses the student’s overall learning experience.

CM students are required to complete GER Quantitative Skills classes up to MATH 251, *Calculus I* or STAT A253, *Applied Calculus for Managerial and Social Sciences.* Numerical skills are critically important in construction management. CM A163 *Building Cost Estimating*, CM A 202 *Construction Project Scheduling*, and CM A263 *Civil Cost Estimating* apply and develop quantitative skills needed to effectively manage the time and cost parameters of construction projects.

The construction industry currently represents approximately 6% of the U.S. GDP or $650 billion annually. The Social Science GER, ECON 201 *Principles of Macroeconomics,* provides perspective needed to understand the role that the construction industry plays in the US and global economies and recognize trends that impact and guide industry investment.

The Humanities GERs, PHIL A301 *Ethics* and A305 *Professional Ethics,* lay the foundation for further investigation of legal ethics, explored in CM A401, *Construction Law*, and environmental ethics explored in CM A422, *Sustainability in the Built Environment*.

# STUDENT LEARNING OUTCOME 1

**1. Demonstrate effective communication, both orally and in writing.**

1.1 Source Course – AET A102 – Methods of Building Construction

**Assessment Data 1.1** -

Assignment 1:

*Methods of Building Construction* introduces basic knowledge of building materials, systems, and assemblies. The class focus is on current, commonly used methods and materials. Research assignments are intended to supplement students’ understanding of the range of methods and materials available within the construction industry. Assignment 1 introduces students to the concept of sustainability. Students are asked to choose from a list of materials that are recycled or reused in the building industry, write a research paper, and present their findings to the class using presentation media (preferably Powerpoint or Prezi).

The assignment is worth 100 points based on the following rubrics.

**Written Communication Rubric Oral Communication Rubric**

| **CRITERIA** | **POINTS** |
| --- | --- |
| Punctuality | 10 |
| Organization | 10 |
| Clarity | 10 |
| Depth of Investigation | 10 |
| Grammar / Spelling | 10 |

| **CRITERIA** | **POINTS** |
| --- | --- |
| Organization | 10 |
| Language | 10 |
| Delivery | 10 |
| Content | 10 |
| Appearance | 10 |

STUDENT LEARNING OUTCOME 1 (continued)

1.2 Source Course – CM A201 – Construction Project Management I

**Assessment Data 1.2** -

*Construction Project Management I* examines construction project management methods and processes. Project 6 focuses on jobsite planning and logistics. Students are given civil site plan drawings for a project in Anchorage. They are required to graphically layout the jobsite to facilitate the construction process, provide a narrative that explains their rationale for the location of facilities, reference Division 1 - General Requirements and pertinent specification requirements, and present their solution to the class.

The assignment is worth 50 points based on the following rubrics

**Written Communication Rubric Oral Communication Rubric**

| **CRITERIA** | **POINTS** |
| --- | --- |
| Punctuality | 10 |
| Organization | 10 |
| Clarity | 10 |
| Grammar / Spelling | 10 |

| **CRITERIA** | **POINTS** |
| --- | --- |
| Organization | 2 |
| Language | 2 |
| Delivery | 2 |
| Content | 2 |
| Appearance | 2 |

# STUDENT LEARNING OUTCOME 2

**2. Create construction project cost estimates.**

2.1 Source Course – CM A163 – Building Construction Cost Estimating

**Assessment Data 2.1** – - The final project for this course is a detailed contractor’s cost estimate for a two million dollar commercial project. The students are divided into 2-3 person teams and asked to create fictitious construction companies. The project includes the following tasks: Detailed quantity surveys for all materials, detailed cost estimates for all self-performed work, calculation of the general composite rate, detailed estimate for all general requirements, general conditions costs including O&P, contract bond and insurance costs, subcontractor bid and material supplier analysis and packaging, acknowledgement of addendums, and preparation of the bid documents for a set bid time and date. The students then compete against each on bid day to be the lowest responsive bidder for the project.

The point value for the final project is 400 points which is approximately 20 percent of the student’s grade in the course. Additionally “Final Bid Pricing Penalty & Bonus Points” are provided to student teams offering as many as 30 additional bonus points or 30 penalty points simulating real world financial risks contractors’ face when bidding a project.

The scores for the above defined portion of the grading rubric are direct measure of each student’s ability to create construction project cost estimates for competitively bid commercial projects.

**Grading Rubric**

* Accuracy and completeness of your estimate. 150 Points
  + Accurate quantities for self-performed work 25 Points
  + Proper means pricing for Self performed work 25 Points
  + Accurate and reasonable pricing for Division 1 50 Points
  + Bethel PATC Estimate spreadsheet 50 Points
* Proper evaluation of sub bids and quotations. 100 Points
  + Were the right combination of sub bids utilized 25 Points
  + Was Air Fare, shipping, and Roof & Board included 25 Points
  + Was there any overlapping scopes of work 25 Points
  + Was anything left out 25 Points
* Proper evaluation and acknowledgement of Addendums 50 Points
  + Were the right bid adjustments made
  + Did the bidder read the addendums carefully and follow instructions
  + Were the addendums acknowledged on the bid form

* Professional and timely submission of proposal and bid documents. 100 Points
  + Were the bid documents complete and professional? 20 Points
  + Were the bid documents filled out correctly? 20 Points
  + Were the bid documents submitted on time? (10 %) 40 Points
* Final Bid Pricing Penalty & Bonus Points
  + Basic Bid is too High (10 % above the 2nd highest bidder) -20 Points
  + Basic Bid is way to High (20 % above the 2nd highest bidder) -30 Points
  + Basic Bid is too Low (10% below the 2nd lowest bidder) -20 Points
  + Basic Bid is way too Low (20% below the 2nd lowest bidder) -30 Points
  + Basic Bid is the 1st Low Responsive Bid +30 Points
  + Basic Bid is the 2nd Low Responsive Bid +20 Points
  + Basic Bid is the 3rd Low Responsive Bid +10 Points

STUDENT LEARNING OUTCOME 2 (continued)

2.2 Source Course – CM A263 – Civil Construction Cost Estimating

**Assessment Data 2.2** – The final cost estimate in this class, Estimate 11, uses previous estimates for quantity take offs and equipment selection as indicated below. Estimate 11 includes material, labor, and equipment direct costs, same of indirect costs, all Division One costs, overhead, bonding and insurance, contingency and profit. Estimate 11 also requires an equipment utilization schedule to level resources.

Estimate 3 – Average End Area Method – 3500 lineal feet of railroad bed – cut and fill quantities Estimate 4 – Soil profile and mass diagram to establish haul plan

Estimate 5 – Grid Cell Method – Cut and fill quantities – 157,500 square foot parking lot

Estimate 6 – Quantity take off for utility installations

Storm sewer

Sanitary sewer

Water line

Telecommunications duct bank

Electrical duct bank

Estimate 9 – RR bed equipment selection and duration calculations

Estimate 10 – Parking lot and utility equipment selection and duration calculations

A grading rubric is used to score each final estimate. This rubric is included in the course syllabus and is explained to the class.

# STUDENT LEARNING OUTCOME 3

**3. Create construction project schedules.**

3.1 Source Course – CM A202 – Project Planning and Scheduling

**Assessment Data 3.1** - Project 5 for this course is the preparation of a detailed construction schedule for a large commercial project (approximately 100 activities). The students are divided into 2 person teams and asked to create this detailed CMP schedule. The project is broken up into two separate parts or submissions each worth 200 points. The students are given plans and project narrative with construing dates.

**Submission 1:** The student teams are asked to identify all activities, create a work breakdown structure, estimate activity durations, hand draft a CMP schedule, perform a forward pass calculating project duration, and calculate both early start and early finish dates.

**Submission 2:** Based on the student teams completed work in Submission 1, the student teams may proceed to develop their project schedule using Microsoft Project software. The final submission 2 includes a printed CPM network diagram. The network diagram must identify the following; Milestone dates, ES-EF-LS-LF, activity float, total float, and a critical path.

The point value for project 5 is 150 points which is approximately 15 percent of the student’s grade in the course. An additional 25 bonus points are available to student teams who elect to complete submission 2 in P6 (Primavera 6) instead of MS Project. P6 is not featured in this course so outside training must be obtaining in order to use P6.

The scores for the above defined portion of the grading rubric are direct measure of each student’s ability to create a construction project CPM schedule for a commercial project.

**Grading Rubric**

* Submission 1 (Hand Drawn CPM Schedule) 75 Points
  + Proper Activity logic 25 Points
  + Proper Activity Identification 25 Points
  + Forward Pass w/ ES,LS, Project Duration 25 Points
* Submission 2 (M.S. Project Network Diagram) 75 Points
  + Milestone Dates 25 Points Schedule logic (No unconnected activities) 25 Points
  + Critical Path & does the schedule make since 25 Points
* Bonus Points - Submission 2 completed in P-6 software 25 Points

STUDENT LEARNING OUTCOME 3 (continued)

3.2 Source Course – CM A202 – Project Planning and Scheduling

**Assessment Data 3.2** - The final exam for this course has a take home portion which includes a 2 page construction narrative for a commercial construction project. The student must develop a construction project schedule using only the provided project narrative. The final deliverable is a CPM schedule with approximately 70 activities completed on Microsoft Project including a printed network diagram and a critical path.

The point value for the take home portion of the final exam is 100 points which is approximately 10 percent of the student’s grade in the course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s ability to create a construction project CPM schedule for a commercial project.

**Grading Rubric**

* Final Take Home Exam 100 Points
  + Proper Activity logic 25 Points
  + Proper Activity Identification 25 Points
  + Proper Activity Durations 25 Points
  + Critical Path & does the schedule make since 25 Points

# STUDENT LEARNING OUTCOME 4

**4. Demonstrate the ability to use current technology related to the construction process.**

4.1 Source Course – AET A101 Fundamentals of CADD for Building Construction

Assignment 6: Sections:

*Fundamentals of CADD for Building Construction* introduces students to AutoCAD in the creation and use of construction drawings. Assignment 6 asks students to build on their understanding of how to make and read construction documents by using floor plans and elevations that they have developed in previous assignments to create section drawings of a building. They are required to reference door and window schedules to understand the symbols used in construction documents and how symbols are used to navigate a set of construction documents. Students must understand the configuration of building components and accurately draw and locate them in reference to a floor plan. Students must identify section symbols and understand what building elements are communicated in a section drawing.

The assignment is worth 100 points based on the following rubric.

| **CRITERIA** | **POINTS** |
| --- | --- |
| Punctuality | 20 |
| Accuracy | 20 |
| Completion | 20 |
| Comprehension | 20 |
| Presentation | 20 |

STUDENT LEARNING OUTCOME 4 (continued)

4.2 Source Course – CM A202 – Project Planning and Scheduling

**Assessment Data 4.2** - Project 5 for this course is the preparation of a detailed construction schedule for a large commercial project (approximately 100 activities). The students are divided into 2 person teams and asked to create this detailed CMP schedule. The project is broken up into two separate parts or submissions each worth 75 points. The students are given plans and project narrative with construing dates.

**Submission 1:** The student teams are asked to identify all activities, create a work breakdown structure, estimate activity durations, hand draft a CMP schedule, perform a forward pass calculating project duration, and calculate both early start and early finish dates.

**Submission 2:** Based on the student teams completed work in Submission 1, the student teams may proceed to develop their project schedule using Microsoft Project software. The final submission 2 includes a printed CPM network diagram. The network diagram must identify the following; Milestone dates, ES-EF-LS-LF, activity float, total float, and a critical path.

The point value for submission 2 of project 5 is 75 points which is approximately 7 percent of the student’s grade in the course. An additional 25 bonus points are available to student teams who elect to complete submission 2 in P6 (Primavera 6) instead of MS Project. P6 is not featured in this course so outside training must be obtaining in order to use P6.

The scores for submission 2 for the above defined portion of the grading rubric are direct measure of each student’s ability to use current technology (Microsoft Project and Primavera P-6) related to the construction process..

**Grading Rubric**

* Submission 2 (M.S. Project Network Diagram) 75 Points
  + Milestone Dates 25 Points
  + Schedule logic (No unconnected activities) 25 Points
  + Critical Path & does the schedule make since 25 Points
* Bonus Points - Submission 2 completed in P-6 software 25 Points

STUDENT LEARNING OUTCOME 4 (Continued)

4.3 Source Course – CM A213 – Civil Technology

**Assessment Data 4.3** – This course outlines the elements of civil design. The students become familiar with all the major design tasks in a civil project. The students employ Autodesk Civil 3D to go from field information to finished design.

Lab 2: Students identify data collected in the field, convert it to a known surveying format file, setup a coordinate system and import the information using Civil 3D. The process includes the creation of drawings with the survey data points of known existing features. Using this information students create and identify an existing surface to be used as a base for the design of a proposed site. Future projects will use this as a base for other design elements.

Lab 2 is worth 100 points based on the following rubric.

| **CRITERIA** | **POINTS** |
| --- | --- |
| Process | 20 |
| Accuracy | 20 |
| Completion | 20 |
| Comprehension | 20 |
| Presentation | 20 |

# STUDENT LEARNING OUTCOME 5

**5. Interpret construction documents (contracts, specifications, and drawings) used in managing a construction project.**

5.1 Source Course – AET A101 – Fundamentals of CADD for Building Construction

**Assessment Data 5.1** -

Test 5:

*Fundamentals of CADD for Building Construction* introduces students to AutoCAD in the creation and use of construction documents. They are taught that the Contract Drawings are only a part of the overall Contract Documents and that the written Specifications and Contract Requirements must be used in conjunction with the drawings. Test 5 demonstrates the range of material that students are expected to know in order to effectively interpret construction drawings, cross referencing graphic information with written information.

The test is worth 100 points.

STUDENT LEARNING OUTCOME 5 (continued)

5.2 Source Course – CM A201 – Construction Project Management I

**Assessment Data 5.2** -

Team Project 2:

For Team Project 2 in *Construction Project Management I* students are each given a half-size set of construction drawings and a complete Project Manual for the Office of Aircraft Services in Anchorage. They are required to answer a series of thirty seven questions that lead them throughout the construction documents. Students must interpret information shown in the drawings, find information contained throughout all divisions of the specifications, and understand the use of drawing symbols used to navigate a set of construction documents.

The project is worth 50 points.

# STUDENT LEARNING OUTCOME 6

**6. Apply basic principles of construction accounting.**

6.1 Source Course – CM A163 – Building Construction Cost Estimating

**Assessment Data 6.1** - Study session 5 covers subcontracts and materials purchasing. This study session also includes using purchase orders and basic job cost accounting principles.

The students understanding of basic job cost accounting principles are specifically in Quiz 2. This quiz includes 10 short answer questions and has a point value of 25 points. There are 4 quizzes in this course which represent 8 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s understanding of the application of basic principles of construction job cost accounting.

A score above 75% is considered to have met the student learning outcome.

**Grading Rubric (Quiz 2)**

* 10 questions-2.5 Points each, short answer. 25 points

**Total Score 25 Points**

STUDENT LEARNING OUTCOME 6 (continued)

6.2 Source Course – CM A201 – CM A201 – Construction Project Management I

**Assessment Data 6.2** -Study session 5 covers subcontracts and materials purchasing. This study session also includes using purchase orders and basic job cost accounting principles.

The students understanding of basic job cost accounting principles are specifically in Quiz 2. This quiz includes 10 short answer questions and has a point value of 25 points. There are 4 quizzes in this course which represent 8 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s understanding of the application of basic principles of construction job cost accounting.

**Grading Rubric (Quiz 2)**

* 10 questions-2.5 Points each, short answer. 25 points

**Total Score 25 Points**

# STUDENT LEARNING OUTCOME 7

**7. Use basic surveying techniques used in building layout.**

7.1 Source Course – GEO A181 – Construction Survey

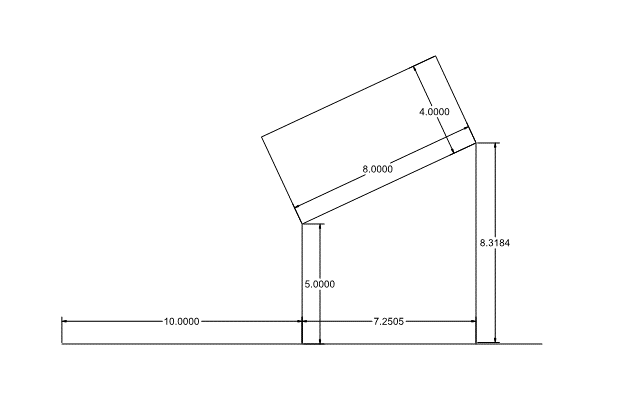
**Assessment Data 7.1** - Project 4 – Survey Layout

Part I - As a group compute the angles and distances to layout the 4' x 8' rectangle as related to the baseline in the attached .PDF.  
  
Part II - As a group stake out the 4' x 8' rectangle using the angles and distances you computed.

Part III - Measure the 4 sides of the rectangle and the two diagonals as laid out on the ground.

Deliverable: send the instructor your measurements.

Grading: A - perimeter less than 0.10 feet of computed  
 B - perimeter less than 0.25 feet of computed  
 C - perimeter less than 0.40 feet of computed  
 D - perimeter less than 0.50 feet of computed  
 F - perimeter greater than 0.50 feet of computed



STUDENT LEARNING OUTCOME 7 (continued)

7.2 Source Course – CM A213 – Civil Technology

**Assessment Data 7.2** - This course outlines the elements of civil design. The students become familiar with all the major design tasks in a civil project: design, material quantities, cost estimation. The students are introduced to construction surveying.

Lab 5: Students layout parcels, size parcels and edit parcels, utilizing basic surveying techniques embedded in the Civil 3D software.

Lab 5 is worth 100 points based on the following rubric:

| **CRITERIA** | **POINTS** |
| --- | --- |
| Process | 20 |
| Accuracy | 20 |
| Completion | 20 |
| Comprehension | 20 |
| Presentation | 20 |

# STUDENT LEARNING OUTCOME 8

**8. Discuss basic principles of ethics in the construction industry.**

8.1 Source Course – CM A163 - Building Construction Cost Estimating

**Assessment Data 8.1** - For this course lab/study sessions 15“Managing and Estimating for the Subcontractor”, 16 “General Conditions and General Requirements” and 17“Completing the Estimate “specifically focus on ethics during the estimating and bidding process for a construction project.

The students understanding of ethics in the construction industry will be specifically assessed in CEQ-1. CEQ-1 includes 10 short answer questions on construction ethics during the construction and bidding process. CEQ-1 has a point value of 100 points which represents approximately 5 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s understanding of the basic principles of ethics in the construction industry.

**Grading Rubric CEQ-1**

* 10 questions-10 Points each, short answer. 100 points

**Total Score 100 Points**

STUDENT LEARNING OUTCOME 8 (continued)

8.2 Source Course – CM A201 – Construction Project Management I

**Assessment Data 8.2** - For this course lab/study sessions 4 “Contract General Conditions”, 5 “Subcontracts and purchasing”, 6 “Communication, Documentation, and Document control”, 8 “Safety Policies”, 9 “Project Quality”, and 14 “Claims an Dispute Resolution” all focus on ethics and ethical principles for running commercial construction projects.

The students understanding of ethics in the construction industry will be specifically assessed in Quiz-4. This quiz includes 10 short answer questions and has a point value of 25 points. There are 4 quizzes in this course which represent 8 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s understanding of the basic principles of ethics in the construction industry.

**Grading Rubric (Quiz 4)**

* 10 questions-2.5 Points each, short answer. 25 points

**Total Score 25 Points**

# STUDENT LEARNING OUTCOME 9

**9. Identify the fundamentals of contracts, codes, and regulations that govern a construction project.**

9.1 Source Course – AET A123 – Codes and Standards

**Assessment Data 9.1** – This entire course is based on the Municipality of Anchorage Title 21 (Land Use), the 2012 International Building Code, and associated codes which is regulatory law. The final exam has includes 25 regulatory law questions and problems based on the 2012 IBC.

The final exam has a point value of 300 points which is approximately 13 percent of the student’s grade for the course.

The scores for the final exam are direct measure of each student’s understanding of fundamentals of contracts, codes, and regulations that govern a construction project.

**Grading Rubric**

Final Exam 25 Questions 100 Points

**Alternative Assessment 9.1** There is no final exam. A final project of a code analysis for a proposed structure, as presented in a construction document set, is prepared by the student. The code analysis incorporates elements of the Title 21 and the IBC that include: Zoning districts; Setbacks; Parking; Accessibility for parking, access, and operations; Landscaping requirements; Construction types classification; Height and area limitations and modifications; Occupancy use; Means of egress; Fire resistance ratings for components and assemblies; and Special inspection requirements.

The code analysis is prepared by listing: Existing conditions for each category, cite code required conditions with references, and recommendations for compliance where deficiencies in the design are recognized. Students also edit the construction documents to show the ‘worst case scenario’ for path of egress, location of alarms, exit signs, a fire control center, and emergency lighting. The project comes from their own design results in the AET A121 Architectural Drawing class or a student designed building for the theoretical UAA School of Architecture.

There is a scoring sheet and the value of the project is 100 out of a total of 2000 points possible for the class.

STUDENT LEARNING OUTCOME 9 (continued)

9.2 Source Course – CM A201 – Construction Project Management I

**Assessment Data 9.2** – Study Session 3”Construciton Documents and Contracts” and study session 4”Contract General Conditions” covers in detail construction contracts, codes, and regulations for construction projects.

The students understanding of the fundamentals of contracts, codes, and regulations that govern a construction project will be specifically assessed in Quiz 1. This quiz includes 10 short answer questions and has a point value of 25 points. There are 4 quizzes in this course which represent approximately 8 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s understanding of the fundamentals of contracts, codes, and regulations that govern a construction project.

**Grading Rubric (Quiz 1)**

* 10 questions-2.5 Points each, short answer. 25 points

**Total Score 25 Points**

# STUDENT LEARNING OUTCOME 10

**10. Recognize basic construction methods, materials and equipment.**

10.1 Source Course – AET A102 – Methods of Building Construction

**Assessment Data 10.1** - Midterm Examination:

The midterm examination for Methods of Building Construction covers foundation types, concrete composition and cement types, steel reinforcement in concrete, precast and site cast methods of concrete construction, formwork construction, masonry construction, types of masonry, mortar types and their specific applications, steel construction, steel production, metal types, alloy steels, steel shapes, steel joinery methods, and weld types.

The examination is worth 200 points.

STUDENT LEARNING OUTCOME 10 (continued)

10.2 Source Course – CM A163 – Building Construction Cost Estimating

**Assessment Data 10.2** - The Great Turkey Take Off for this course is a team project (before the thanksgiving break) which challenges students to create a subcontractors cost proposal for civil work on a commercial project. The students are provided with plans and specifications for the project and must complete all quantity take offs, material and equipment pricing, labor rate calculations, and overhead & profit calculations. The final deliverable includes a subcontractor’s cost proposal on letterhead worthy of the workplace environment.

The point value for The Great Turkey Take off 50 points which is approximately 5 percent of the student’s grade in the course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s ability to recognize basic construction methods, materials, and equipment.

**Grading Rubric**

* “The Great Turkey Take Off” 50 Points

# STUDENT LEARNING OUTCOME 11

**11. Recognize basic safety hazards on a construction site and standard prevention measures**.

11.1 Source Course – CM A201 – Construction Project Management I

**Assessment Data 11.1** - Study Session 8”Safety Policies” covers in detail safety hazards on a construction site and standard prevention measures.

The students understanding of the safety hazards on a construction site and standard prevention measures will be specifically assessed in Quiz 3. This quiz includes 10 short answer questions and has a point value of 25 points. There are 4 quizzes in this course which represent approximately 8 percent of the student’s final grade for this course.

The scores for the above defined portion of the grading rubric are direct measure of each student’s ability to recognize basic safety hazards on a construction site and standard prevention measures.

**Grading Rubric (Quiz 3)**

* 10 questions-2.5 Points each, short answer. 25 points

**Total Score 25 Points**

STUDENT LEARNING OUTCOME 11 (continued)

11.2 Source Course – CM A205 – Construction Safety

**Assessment Data 11.2** - **Students are presented with the curriculum of the OSHA 30-Hour Construction Industry Outreach Program. This training program** provides training for workers and employers on the recognition, avoidance, abatement, and prevention of safety and health hazards in workplaces. The program specifically addresses the OSHA Focus Four Hazards **(Falls, Struck-by, Electrocution & Caught-in or Between).**

Students are evaluated on this information using all four tests for the course. Student scores on all four tests are used to demonstrate achievement of this student learning outcome. This score is a part of the total evaluation for the course, but is not the final course grade.

# STUDENT LEARNING OUTCOME 12

**12. Recognize the basic principles of structural design.**

12.1 Source Course – AET A231 – Structural Technology

**Assessment Data 12.1** - This course examines structural theory and the physical principles that underlie structural behavior. The course is divided into analysis and design. The projects that demonstrate the basis structural design are the shear and moment diagrams. Design can only proceed when the effects of loading are known.

Test 2:

Test 2 evaluates students’ ability to recognize the principles of equilibrium and the effects of loading on a beam.

Test 2 is worth 200 points. The problems in CM A231 are graded on the correctness of the solution, however points are deducted for unprofessional presentation.

STUDENT LEARNING OUTCOME 12 (continued)

12.2 Source Course – CM A231 – Structural Technology

**Assessment Data 12.2** - This course examines structural theory and the physical principles that underlie structural behavior. The course is divided into analysis and design. The projects that demonstrate the basic principles of structural design are the design of beams in three different materials – steel, wood, and reinforced concrete. This data point is the design of simply supported wide-flange steel beams that are a part of a structural framework.

Test 3:

Test 3 evaluates students’ ability to recognize the principles of structural design of steel beams.

Test 3 is worth 200 points. The problems in CM A231 are graded on the correctness of the solution, however points are deducted for unprofessional presentation.

# STUDENT LEARNING OUTCOME 13

**13. Recognize the basic principles of mechanical, electrical and piping systems.**

13.1 Source Course – AET A142 – Mechanical & Electrical Technology

**Assessment Data 13.1** - **Mechanical Systems**

Project 5:

*Mechanical and Electrical Technology* introduces students to the basic concepts, processes, and fundamentals of mechanical and electrical systems common to all buildings. Project 5 focuses on the fluid mechanics associated with water supply systems and the principles used in determining drain, waste, and vent (DWV) requirements. It requires students to calculate water supply pipe requirements based on municipal water supply pressure. Students must reference the Uniform Plumbing Code (UPC) to determine the number of Water Supply Fixture Units associated with supply lines to calculate pipe sizes. Students must also use the UPC to determine the Drainage Fixture Units used to calculate DWV requirements. Calculations are presented in AutoCAD as a Mechanical Plan layout.

Project 5 is worth 80 points based on the following rubric.

| **CRITERIA** | **POINTS** |
| --- | --- |
| Process | 20 |
| Accuracy | 20 |
| Completion | 20 |
| Comprehension | 20 |
| Presentation | 20 |

STUDENT LEARNING OUTCOME 13 (continued)

13.2 Source Course – AET A142 – Mechanical & Electrical Technology

**Assessment Data 13.2** - **Electrical Systems**

Final Exam:

*Mechanical and Electrical Technology* introduces students to the basic concepts, processes, and fundamentals of mechanical and electrical systems common to all buildings. The Final Exam covers material primarily associated with electrical systems. Students must be able to differentiate between series and parallel circuits, AC and DC power, calculate amps, volts, watts, and power within electrical circuits, explain how electrical components (such as GFCI receptacles, single pole, double pole, 3-way & 4 way switches, and transformers) work, explain the types and relative efficiencies of various lamps, demonstrate the use of National Electrical Code tables to determine safe wire sizes, and calculate demand and power usage, applying local electrical utility billing rates.

The Final Exam is worth 188 points.