

# Assessment Instruments

## Student Outcomes & Competency Assessment

- **Capstone Evaluation**

This assessment tool centers on the requirement of all Construction Management students to enroll in a capstone course, CMGT 431 Commercial & Residential Construction Capstone.

This course requires students to work on an actual project combining all aspects of their education to produce a proposal of the project, responding to a Request for Proposals (RFP) provided by the instructor. The purpose of the capstone course is to synthesize all aspects of construction theory into a concrete application. Students are required to review the documents, draft, develop construction cost estimates, suggest ideas for sustainability and value engineering, analyze costs, develop a construction schedule, develop a project-specific safety plan, and provide the proper documentation for their clients. Final presentations are evaluated by Construction Management faculty, as well as an external panel of client representatives.

- **Cooperative Education Evaluation**

There are two formal assessment tools actively being utilized to evaluate the co-op education experience.

- Students are required to evaluate their own experience

- Employers are asked to evaluate the student's performance and to provide feedback where appropriate.

Additionally, during site visits by the co-op faculty coordinator, faculty interview the student's supervisor asking about areas of strengths and weaknesses in the student's preparation and ask if there are suggestions for corrective efforts in the program.

- **American Institute of Constructors Associate Constructor (AC) Exam**

The implementation of this exam started in the fall of 2014, and is conducted as part of the capstone course prior to graduation.

The main advantage of this exam is to provide an objective measurement of student learning and retention, in comparison to the students' national peers, and allow feedback to be used to bridge any gaps and remedy and perceived weaknesses. In addition, it is an opportunity for students to gain the AC designation, leading to the CPC designation later on.

- **Course Evaluations**

In addition to the University-administered course evaluations at the end of each semester by the standard eleven question surveys distributed online and analyzed by the University, the Department of Construction Management courses are also evaluated at middle and the end of the semester by the Department Chair through a department-initiated form, and the information is shared with the faculty in a timely fashion for possible improvements within the same semester.

Evaluations are being considered for course content and teaching approach to ensure that students are learning and faculty are utilizing appropriate techniques in their classes.

## Program Assessment

- **Graduating Senior Exit Survey** - This survey is given to all graduating seniors at the end of their last semester. This is followed by a one-on-one meeting with the department

chair to listen to any final observations and areas of improvement for the program.

- **Alumni Survey** - This survey is sent out every three years to alumni who graduated from the CMGT Program.
- **Employer Survey** - This survey is sent to employers of NKU CM alumni every three years.
- **Active Advisory Board Input** – The Industry Advisory Board meets at least 5 times a year. Each meeting, a construction management course is discussed in full detail, and results of surveys and analysis of the curriculum according to ACCE standards and expectations are presented to the Board for their input.  
The Board also reviews the entire curriculum every five years. The last curriculum review was in conducted in 2012. We are planning another review during the 2015-2016 academic year due to continuing curriculum improvements.
- **Cooperative Education Evaluation** - This evaluation which consists of two quantitative and one qualitative forms of inquiry are used not only to assess the students, but as an opportunity for employers to express their feedback and to inform us on areas they consider in need of improvement based on the individual's knowledge as a co-op student at their firm.
- **CM Faculty Retreat** - Faculty have a one day retreat at the beginning of every academic year to discuss the direction for the year including curriculum, student organizations, and administrative procedures that may have changed.
- **AIC Associate Constructor Exam (AC)** - The program started the adoption of the AC Exam as a quantitative measure of student learning in fall 2014. The exam is administered as part of the requirements for the capstone course in a student's last semester before graduation.

# **Student Outcomes Defined**

## **Communication**

**Demonstrate the ability to communicate effectively in writing, and electronic presentations; and to speak to groups and individuals while keeping in mind the social constructs of the groups with which they interact.**

Students demonstrate this outcome through writing business reports, proposals, and other technical communications that are concise, logical, and grammatically correct. Presenting information to others verbally, especially with visuals of either simple sketches, detailed drawings or electronically with software such as PowerPoint is essential to this outcome. While the ability to perform these stated skills is important, students must also demonstrate an understanding and recognition of professional practice including human behavior based on knowledge of psychology or sociology, as well as the implementation of codes of ethics governing their work.

## **Mathematics & Science**

**Demonstrate the ability to apply mathematics and physical science to analyze and solve construction science problems.**

Students demonstrate this outcome through the use of math and science to understand the behavior of construction materials, equipment and methods, and the analysis of structures, landforms, and electromechanical systems. This includes solving problems in layout, strength of materials, structural statics, soil mechanics, and mechanical and electrical concepts.

## **Business & Management**

**Demonstrate the ability to manage the principal resources of the construction industry, primarily money and people.**

Students demonstrate this outcome through their understanding, analysis, and explanation of the structure of business organizations and by the ability to manage projects, people and resources. Students demonstrate the practice of people management when they analyze work, safety, field records, quality, and productivity, and use this knowledge to supervise the workers on a job. The theory of money management is demonstrated when students solve problems in economics, accounting, and finance. Another way that students demonstrate people management is by assigning work to the project team, conducting performance evaluations, negotiating with labor organizations, and resolving conflicts among team members.

## **Design Theory**

**Demonstrate the understanding and ability to participate in the design process used by architects, civil engineers, and other design professionals and understanding their construction drawings.**

Students demonstrate this outcome by displaying their efforts to comprehend, analyze, and critique design work done by architects, civil engineers, and other design professionals, and can participate in the design

process by contributing knowledge of basic design concepts and construction management to improve the project. Students must be able to describe and explain the design of construction systems including structures, HVAC, plumbing, electrical, roadway, drainage, and utilities.

## **Construction Graphics**

**Demonstrate the ability to read, interpret, and understand the development of graphical representation of construction projects including the vocabulary incorporated and computer applications utilized in their creation.**

Students demonstrate the ability to communicate in graphic representation of the construction project by means of hand sketches as well as the incorporation of computer aided drafting software such as AutoCAD to develop details. Students are also exposed to 3d and 4d graphics to detect and resolve systems clashes. Students must be able to produce layout plans for site work, utilities, roadways, surveys, floor plans, interior and exterior elevations, building and wall sections, and details for specific areas within the structure. Students must be able to recognize the different line types and their meaning, scales, notes, specifications, and reference conventions incorporated into the graphical representation.

## **Construction Surveying**

**Demonstrate the knowledge of the site engineer's responsibility and the ability to accurately layout, survey and control the construction site.**

Students demonstrate this outcome through their ability to understand, process, and produce calculations, plans, and physical monumentation including control points, building corners benchmarks, witness control, earthwork control, and elevations. Students must be able to perform basic fieldwork operations pertaining to record keeping, site organization and development, and to demonstrate knowledge of the scope and responsibility of the site engineer.

## **Construction Methods & Materials**

**Demonstrate the ability to locate, identify, and present materials used in the construction process based on properties, designations, testing requirements, and cost analysis.**

Students must be able to describe construction materials, assembly techniques, construction equipment, components, and material testing, and explain the benefits and costs associated with

each. Students must be able to describe the uses, benefits, and costs of temporary facilities, rigging, formwork, scaffolding, and foundations.

### **Estimating**

**Demonstrating the ability to perform accurate and complete quantity take offs for all resources located on a standard construction site including but not limited to labor, material, and equipment and to then apply pricing for those quantities taking into account direct and indirect costs.**

Students demonstrate their proficiency through the ability to accurately complete quantity takeoffs for the variety of estimates used in the construction profession. Students must demonstrate the ability to locate and recognize the needed materials, labor, and equipment for the major components of a variety of structures and systems including but not limited to site-work, residential, and commercial construction.

Students also demonstrate the ability to create accurate cost estimates generated from those quantities based on direct and indirect cost and the ability to quickly and accurately compile a competitive bid for submission using computer software.

### **Planning & Scheduling**

**Demonstrate the ability to identify activities needed for a project and then logically organize the construction process using CPM method while remaining conscious of the parameters affecting the project planning including resource allocations, and the impact of changes.**

Competency in this outcome is demonstrated by the students by logically organizing the construction process, performing both hand calculations and computer modeling of the network calculations pertaining to the Critical Path Method (CPM). While developing their network model, students must demonstrate knowledge and understanding of the parameters affecting project planning and the impact that changes have to the construction process. Students utilizing computer software must produce easily understandable graphical representation of the schedule for communication with project stakeholders. Students must also show understanding and sensitivity to the needs of the resource allocation and management.

### **Construction Accounting & Financing**

**Demonstrate the understanding of costs associated with construction and the ability to forecast money needed during the duration of the project based on fixed and variable cost, capital equipment expenses, and bidding & procurement practices.**

Students demonstrate proficiency in this outcome by understanding and preparing cash flow analysis and other business documents based on knowledge of business law, accounting, and economics. The practice of money management is demonstrated when students can survey the quantities and costs of materials and labor needed for a project, prepare a bid, and follow a bidding strategy. The practice of money management is also demonstrated when a student prepares a project budget, purchasing procedures, cost control measures, and other project controls.

## **Construction Law**

**Demonstrate the understanding and ability to locate laws relating to construction and labor laws and relations including contracts, contractor's rights, lien laws, and administrative procedures to avoid disputes.**

Students must demonstrate a basic understanding of general legal concepts in the area of torts, contracts, property law, constitutional law, administrative law, and employment and workers' compensation law. Additionally, students must demonstrate a basic understanding of the judicial system including small claims court, arbitration, district court, and circuit court. Students demonstrate these skills by developing and showing analytical, speaking, and writing skills.

## **Safety**

**Demonstrate the ability to identify safety concerns and violations and the ability to correct, improve, document safe construction practices, and protect workers against dangers associated with the construction operations.**

Students demonstrate proficiency in this outcome when they show their ability to recognize and identify common hazards in the construction industry, obtain the knowledge to apply the OSHA Standards to practical situations on construction sites, and the ability to develop through standards interpretation measures to reduce or prevent injury or illness in the construction industry. Additionally, students display proper assessment of various risk management and administrative safety and health concepts as they pertain to the construction industry and to relay the importance of creating positive safety attitudes and behavior-based safety approaches while attempting to get all employees, from top management down to the newest employees, more involved in safety in the construction industry.

## **Project Management**

**Demonstrate the understanding of the concepts, roles, and responsibilities of the project manager and the supervisors on a construction project.**

Students demonstrate this outcome by showing evidence of incorporating all of the previous outcomes in an integrated project management and administration plan. This is evident when students can articulate the philosophies, techniques, roles, and responsibilities of the construction manager. The ability to control quality, produce documents outlining procedures to ensure proper labor relations, value analysis, feasibility studies, construction law, safety issues, building codes and regulations, and other essential project management fundamentals that impact business and the construction industry.