



## Architecture and Construction Career Cluster Cluster (Foundation) Knowledge and Skill Statements

The following Cluster (Foundation) Knowledge and Skill Chart provides statements that apply to all careers in the Architecture and Construction Cluster. Persons preparing for careers in the Architecture and Construction Cluster should be able to demonstrate these skills in addition to those found on the Essential Knowledge and Skills Chart. The Pathway Knowledge and Skill Charts are available in separate documents.

| <b>Cluster Topic<br/>ACC01</b> | <b>ACADEMIC FOUNDATIONS: <i>Achieve additional academic knowledge and skills required to pursue the full range of career and postsecondary education opportunities within a career cluster.</i></b>   |
|--------------------------------|---|
| <b>ACC01.01</b>                | <b>Perform math operations such as estimating and distributing materials and supplies to complete jobsite/workplace tasks.</b>  |
| ACC01.01.01                    | Use basic math functions to complete jobsite/workplace tasks.   |
| <i>Sample Indicators</i>       | Identify whole numbers, decimals, fractions, complex numbers, and polynomials.<br>Apply basic arithmetic add, subtract, multiply, and divide operations.<br>Apply relational (equal, not equal, greater than, less than, etc.) and logical operators in a logical expression. |
| ACC01.01.02                    | Use geometric formulas to determine areas and volumes of various structures.  |
| <i>Sample Indicators</i>       | Calculate areas and volumes of structures.<br>Estimate materials and supplies needed.   |
| ACC01.01.03                    | Use appropriate formulas to determine percentages /decimals.  |
| <i>Sample Indicators</i>       | Calculate percentages/decimals.<br>Use percentages/decimals to perform measurement tasks.   |
| ACC01.01.04                    | Use appropriate formulas to determine ratios, fractions, and proportion measures.   |
| <i>Sample Indicators</i>       | Calculate ratios, fractions and proportion measures.<br>Use ratios, fractions and proportion measures to perform measurement tasks.   |
| ACC01.01.05                    | Use appropriate formulas to determine measurements of dimensions, spaces and structures.  |
| <i>Sample Indicators</i>       | Measure dimensions, spaces and structures using U.S. Standard unit.<br>Measure dimensions, spaces and structures using Metric units.<br>Use dimensions, spaces and structures calculations to estimate materials and supplies needed.   |
| ACC01.01.06                    | Conceptualize a three-dimensional form from a two-dimensional drawing to visualize proposed work.   |
| <i>Sample Indicators</i>       | Build Create three-dimensional form models.   |
| <b>ACC01.02</b>                | <b>Apply principles of physics as they relate to worksite/jobsite situations to work with materials and load applications.</b>  |
| ACC01.02.01                    | Apply basic concepts of statics and loads to planning.  |
| <i>Sample Indicators</i>       | Use the basic concepts of static and load calculations for rigging and moving loads.  |
| ACC01.02.02                    | Identify the physical properties present when using common construction materials in order to use the materials safely, effectively and efficiently.  |



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*Sample Indicators* Use the basic concepts of physics when working with common construction materials.

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| <b>Cluster Topic<br/>ACC02</b>          | <b>COMMUNICATIONS:</b> <i>Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information.</i>  |
| <b>ACC02.01</b>                         | <b>Use vocabulary and visual cues commonly used in design and construction to be successful in workplace/jobsite communications.</b>   |
| ACC02.01.01<br><i>Sample Indicators</i> | Match vocabulary and visual cues to workplace/jobsite situations.<br>Use correct terminology to convey verbal and visual.  |
| ACC02.01.02<br><i>Sample Indicators</i> | Utilize vocabulary and visual cues in context of design and construction situations.<br>Confirm understanding of verbal and visual instructions.<br>Ask questions concerning details of instructions.<br>Perform assignments as requested. |
| <b>Cluster Topic<br/>ACC03</b>          | <b>PROBLEM-SOLVING AND CRITICAL THINKING:</b> <i>Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</i>                         |
| <b>ACC03.01</b>                         | <b>Create and implement project plans considering available resources and requirements of a project/problem to accomplish realistic planning in design and construction situations.</b>  |
| ACC03.01.01<br><i>Sample Indicators</i> | Plan, organize, schedule and manage a project/job to optimize workflow and outcome.<br>Report results of the project/job.  |
| ACC03.01.02<br><i>Sample Indicators</i> | Manage the schedule of a project/job.<br>Identify timeline required to complete a project/job.<br>Evaluate efficiency and effectiveness of a project/job.  |
| ACC03.01.03<br><i>Sample Indicators</i> | Estimate resources/materials required for a specific project or problem.<br>Estimate correct amount of required resources/materials.<br>Create a budget.   |
| ACC03.01.04<br><i>Sample Indicators</i> | Use available resources/materials effectively while completing a project or resolving a problem with a project plan.<br>Evaluate waste of resources/materials.<br>Evaluate necessity for additional resources/materials.                   |
| ACC03.01.05<br><i>Sample Indicators</i> | Determine alternative solutions for a specific project/problem.<br>Evaluate feasibility of alternative suggestions.<br>Implement appropriate alternatives.   |
| <b>ACC03.02</b>                         | <b>Evaluate and adjust design and construction project plans and schedules to respond to unexpected events and conditions.</b>   |
| ACC03.02.01<br><i>Sample Indicators</i> | Incorporate potential job disruptions into planning time lines.<br>Identify potential events and conditions that disrupt the completion of a job.<br>Solve situational problems involved with unexpected events and conditions.            |



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- ACC03.02.02 Adjust project plans and schedules when presented with unexpected information.
- Sample Indicators* Modify existing plans to reflect an unexpected change.  
Modify existing schedules to reflect an unexpected change.  
Modify existing budget to reflect unexpected change.
- ACC03.02.03 Identify and assess critical situations as they arise to resolve issues.
- Sample Indicators* Evaluate potential solutions and determine best solution.  
Appraise critical situations and implement appropriate response.
- ACC03.02.04 Generate a project update that tracks changes necessitated by unexpected events and conditions.
- Sample Indicators* Present an oral and/or written status report on the project.

### Cluster Topic ACC04

**INFORMATION TECHNOLOGY APPLICATIONS:** *Use information technology tools specific to the career cluster to access, manage, integrate, and create information.*

*No additional statements in this topic beyond those found in the Essential Knowledge and Skills Chart.*

### Cluster Topic ACC05

**SYSTEMS:** *Understand roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. Identify how key organizational systems affect organizational performance and the quality of products and services. Understand global context of industries and careers.*

- ACC05.01 **Comply with regulations and applicable codes to establish a legal and safe workplace/jobsite.**
- ACC05.01.01 Identify governmental regulations and national, state and/or local building codes that apply to a given workplace/jobsite.
- Sample Indicators* Follow governmental regulations and building codes.  
Follow industry regulations and building codes.  
Follow jurisdictional regulations and building codes.  
Use information given in regulations and codes correctly.  
Pass job inspections and comply with regulations at all times.  
Pass required substance abuse screening.
- ACC05.01.02 Evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.
- Sample Indicators* Read and discuss information on OSHA, EPA and other safety regulations.  
Pass safety inspections and comply with regulations at all times.
- ACC05.01.03 Use MSDS (Material Safety Data Sheets) information for the management, use and disposal of materials.
- Sample Indicators* Obtain, understand and follow MSDS (Material Safety Data Sheets) information.  
Use materials safely.
- ACC05.01.04 Identify workplace/jobsite environmental hazards of a given situation.
- Sample Indicators* Follow safe practices relating to environmental hazards.
- ACC05.02 **Examine how the roles and responsibilities among trades/professions work in relationship to complete a project/job.**



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ACC05.02.01 Describe how relationships between trades/professions can facilitate smooth workflow and outcome to meet project goals.

*Sample Indicators* Coordinate work between trades.

ACC05.02.02 Explain how the hierarchy of roles on a jobsite facilitate smooth workflow and outcome to meet project goals.

*Sample Indicators* Incorporate job functions in the reporting chain of supervision.

Evaluate the safety issues and responsibilities managed by each level of supervision.

### **ACC05.03 Examine all factors effecting the project and the planning process.**

ACC05.03.01 Understand social, environmental and political factors that affect the project.

*Sample Indicators* Label all systems on a set of construction documents.

Discuss the interrelationship of the systems in the built environment.

Use the concept of "Critical Path Method (CPM)" and/or similar sequential methods so that work progresses efficiently.

ACC05.03.02 Understand the context of the projects.

### **ACC05.04 Understand and manage union-management relationships and contracts to create a cooperative work environment.**

ACC05.04.01 Analyze a proposed contract in terms of the company's position and union's position in labor contract negotiations.

*Sample Indicators* Document how quality improves profitability.

Report on issues that affect quality.

ACC05.04.02 Assess a situation for compliance with terms of a contract.

#### **Cluster Topic ACC06**

**SAFETY, HEALTH AND ENVIRONMENTAL:** *Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. Follow organizational policies and procedures and contribute to continuous improvement in performance and compliance.*

### **ACC06.01 Assess and control the types and sources of workplace hazards to ensure a safe workplace and jobsite.**

ACC06.01.01 Demonstrate methods to correct common design and construction hazards.

*Sample Indicators* Identify and describe common hazards in the workplace.

Identify and describe major sources of information about hazards in the workplace (e.g., Material Safety Data Sheets (MSDS), work procedures, exposure control plans, training materials, labels, and signage).

Identify sources of combustible/flammable materials, fire and emergencies to establish a fire safe environment.

Interpret safety signs and symbols.

Identify methods for disposing of hazardous materials.

ACC06.01.02 Identify types and sources of workplace hazards common to design and construction situations.

ACG06.01.03 Demonstrate personal and group health and safety practices.

*Sample Indicators* Demonstrate principals of safe physical movement to avoid slips, trips, and spills.



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Inspect and use personal protective equipment (PPE).

| <b>Cluster Topic<br/>ACC07</b> | <b>LEADERSHIP AND TEAMWORK: <i>Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</i></b>  |
|--------------------------------|--|
| <b>ACC07.01</b>                | <b>Establish specific goals to manage project assignments in a timely manner.</b>  |
| ACC07.01.01                    | Establish project goals that assist in meeting project specifications and deadlines.   |
| <i>Sample Indicators</i>       | Define and describe project goals.<br>Identify and list key project activities.<br>Identify and report activity deadlines.   |
| ACC07.01.02                    | Organize work teams that effectively manage assignments.   |
| <i>Sample Indicators</i>       | Determine and list assignments by activity and personnel.<br>Complete assignments.<br>Monitor and write a report on progress of the project.<br>Evaluate completed project according to customer requirements. |
| <b>Cluster Topic<br/>ACC08</b> | <b>ETHICS AND LEGAL RESPONSIBILITIES: <i>Know and understand the importance of professional ethics and legal responsibilities.</i></b>   |
| <b>ACC08.01</b>                | <b>Recognize legal and ethical relationships between employees and employers to establish workplace/jobsite rules, regulations and guidelines in a design and/or construction setting.</b>                     |
| ACC08.01.01                    | Access appropriate resources to identify the roles, rights and responsibilities of an employee and an employer.  |
| <i>Sample Indicators</i>       | Practice workplace/jobsite conduct incorporating employee and employer roles, rights and responsibilities.   |
| ACC08.01.02                    | Examine insurance documentation to determine liability issues associated with a job.   |
| <i>Sample Indicators</i>       | Describe liability issues as needed.   |
| ACC08.01.03                    | Comply with employer policies, procedures, and job specific agreements such as sexual harassment avoidance and substance abuse control to prevent ethical and legal problems.                                  |
| <i>Sample Indicators</i>       | Comply with employer policies and procedures.<br>Comply with project labor agreements.   |
| <b>ACC08.02</b>                | <b>Read regulations and contracts to ensure ethical and safety elements are observed.</b>  |
| ACC08.02.01                    | Study regulations and codes to identify those applicable to the local area.  |
| <i>Sample Indicators</i>       | Locate and implement regulations and codes applicable to tasks and projects.<br>Comply with local, state and Federal codes.  |
| ACC08.02.02                    | Explain the various aspects of service contracts to ensure compliance.   |
| <i>Sample Indicators</i>       | Evaluate and follow service contracts.   |
| ACC08.02.03                    | Recognize the relationship and responsibilities of various parties to a contract.  |



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*Sample Indicators* Fulfill contractual roles and responsibilities.  
Monitor relationships with other parties.

ACC08.02.04 Recognize the definition of specialized words or phrases to fully understand documents and contracts.

*Sample Indicators* Use industry jargon or terminology appropriately.  
Use industry acronyms correctly.  
Use words with multiple meanings correctly in context.

**ACC08.03 Use ethical and legal standards to avoid conflicts of interest in a design and/or construction setting.**

ACC08.03.01 Identify conflicts of interest relating to a job or project to prevent ethical or legal problems.

*Sample Indicators* Resolve issues relating to any potential conflicts of interest.

### Cluster Topic ACC09

**EMPLOYABILITY AND CAREER DEVELOPMENT:** *Know and understand the importance of employability skills. Explore, plan, and effectively manage careers. Know and understand the importance of entrepreneurship skills.*

**ACC09.01 Explain written organizational policies, rules and procedures common in design and construction settings to help employees perform their jobs.**

ACC09.01.01 Locate appropriate information on organizational policies in handbooks and manuals.

*Sample Indicators* Identify the contents of various organizational publications.  
Select the appropriate document(s) as reference for the situation.

ACC09.01.02 Discuss how specific organizational policies and rules influence a specific work situation.

*Sample Indicators* Locate and identify specific organizational policy, rule or procedure to assist with a given situation.

Explain specific organizational policy, rule or procedure to improve a given situation.

**ACC09.02 Recognize the responsibilities and personal characteristics to develop individual goals for professionalism.**

ACC09.02.01 Identify appropriate responsibilities and personal characteristics by researching workplace/jobsite information.

*Sample Indicators* Practice the responsibilities and characteristics of a professional craftsperson.  
Identify all critical/important functions.  
Document customer satisfaction.

ACC09.02.01 Present a professional image in the workplace/jobsite.

*Sample Indicators* Maintain appropriate professional memberships.  
Follow rules, regulations and guidelines.

### Cluster Topic ACC10

**TECHNICAL SKILLS:** *Use the technical knowledge and skills required to pursue the targeted careers for all pathways in the career cluster, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster.*



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### **ACC10.01 Read, interpret, and use technical drawings, documents, and specifications to plan a project.**

- ACC10.01.01 Interpret drawings used in project planning.  
*Sample Indicators* Recognize elements and symbols of blueprints and drawings.
- ACC10.01.02 Describe written standards and that specifications that apply.  
*Sample Indicators* Interpret and explain standards and specifications.
- ACC10.01.03 Recognize how specifications and standards are arranged for proper access.  
*Sample Indicators* Use specifications and standards.  
Apply specifications and standards appropriately.
- ACC10.01.04 Use architect's plan, manufacturer's illustrations and other materials to communicate specific data and visualize proposed work.  
*Sample Indicators* Sketch/draw/illustrate concepts and ideas.  
Draw or sketch plan/layout to be completed.  
Use proper measurements to determine layout.

### **ACC10.02 Use and maintain appropriate tools, machinery, equipment, and resources to accomplish project goals.**

- ACC10.02.01 Select tools, machinery, equipment, and resources that match requirements of the job.  
*Sample Indicators* Operate tools, machinery and equipment in a safe manner.  
Properly maintain and care for tools, machines and equipment.  
Safely use tools, machines, and equipment productively and efficiently in alignment with industry standards.
- ACC10.02.02 Identify sources of information concerning state-of-the-art tools, equipment, materials, technologies and methodologies.  
*Sample Indicators* Read current periodicals, industry publications and manufacturer's catalogs.  
Use state-of-the-art tools, equipment, materials, technologies and methodologies.
- ACC10.02.03 Demonstrate use of tools, machinery, equipment and other resources commonly used in design and construction.