Architecture and Construction Career Cluster

1. Use vocabulary, symbols, and formulas commonly used in design and construction.
   
   **AC 1.1:** Match vocabulary and visual cues to workplace/jobsite situations.
   **Sample Indicators:**
   - Use correct terminology to convey verbal and visual.
   
   **AC 1.2:** Utilize vocabulary and visual cues in context of design and construction situations.
   **Sample Indicators:**
   - Confirm understanding of verbal and visual instructions.
   - Ask questions concerning details of instructions.
   - Perform assignments as requested.

2. Use architecture and construction skills to create and manage a project.
   
   **AC 2.1:** Manage the schedule of a project/job.
   **Sample Indicators:**
   - Identify timeline required to complete a project/job.
   - Evaluate efficiency and effectiveness of a project/job.
   - Adjust project plans to reflect an unexpected change.
   
   **AC 2.2:** Estimate resources/materials required for a specific project or problem.
   **Sample Indicators:**
   - Estimate correct amount of required resources/materials.
   - Create a budget.
   
   **AC 2.3:** Use available resources/materials effectively while completing a project or resolving a problem with a project plan.
   **Sample Indicators:**
   - Evaluate waste of resources/materials.
   - Evaluate necessity for additional resources/materials.

   **AC 2.4:** Determine alternative solutions for a specific project/problem.
   **Sample Indicators:**
   - Evaluate feasibility of alternative suggestions.
   - Implement appropriate alternatives.

   **AC 2.5:** Plan, organize, schedule, and manage a project/job to optimize workflow and outcome.
   **Sample Indicators:**
   - Report results of the project/job.
3. Comply with regulations and applicable codes to establish and manage a legal and safe workplace/jobsite.

AC 3.1: 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.

AC 3.2: Identify workplace/jobsite environmental hazards of a given situation.

Sample Indicators:
- Follow safe practices relating to environmental hazards.
- Identify workplace hazards common to design and construction situations.

AC 3.3: 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.

AC 3.4: 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.

4. Understand the nature and scope of the Architecture & Construction Cluster and the role architecture and construction play in society and the economy.

AC 4.1: Describe how relationships between trades/professions can facilitate smooth workflow and outcome to meet project goals.

Sample Indicators:
- Coordinate work between trades.

AC 4.2: Explain how the hierarchy of roles on a jobsite facilitates 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.
5. Understand the roles and responsibilities among trades and professions including labor/management relationships.

AC 5.1: 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.

AC 5.2: Assess a situation for compliance with terms of a contract.

Sample Indicators:
- No Sample Indicators.

AC 5.3: Discuss the role and responsibilities among the trades/professions in the work environment.

Sample Indicators:
- No Sample Indicators.

6. Read, interpret, and use technical drawings, documents and specifications to plan a project.

AC 6.1: Interpret drawings used in project planning.

Sample Indicators:
- Recognize elements and symbols of blueprints and drawings.

AC 6.2: Recognize how specifications and standards are arranged for proper access.

Sample Indicators:
- Use specifications and standards.
- Apply specifications and standards appropriately.

AC 6.3: 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.

AC 6.4: Describe the written standards and specifications that apply.

Sample Indicators:
- Interpret and explain standards and specifications.
7. Evaluate a wide range of career pathway opportunities for success in architecture and construction careers.

**AC 7.1:** Research and match career opportunities based upon their fit with personal career goals.
*Sample Indicators:*
- Locate and interpret career information for at least one career pathway within the cluster.
- Identify job requirements for the career cluster/pathway.
- Identify educational and credentialing requirements for careers within the cluster.

**AC 7.2:** Match personal interests and aptitudes to careers when researching opportunities within the pathways.
*Sample Indicators:*
- Identify personal interests and aptitudes.
- Identify job requirements and characteristics for selected careers.
- Compare personal interests and aptitudes with job requirements and characteristics of the career selected.
- Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.

**AC 7.3:** Develop a career plan for advancement in architecture and construction careers
*Sample Indicators:*
- No sample indicators

**Construction Pathway (AC-CST)**

1. Understand contractual relations with all parties involved in the building process to ensure successful build of a project.

**AC-CST 1.1:** Establish/implement reporting relationships among stakeholders.
*Sample Indicators:*
- No sample indicators

**AC-CST 1.2:** Create sustainable and accountable partnerships between stakeholders.
*Sample Indicators:*
- No sample indicators

**AC-CST 1.3:** Describe the contracting process to include contract development, the bid process, payment terms, planning approvals, and limitations of liability.
*Sample Indicators:*
- No sample indicators

**AC-CST 1.4:** Describe the role that each stakeholder will assume to ensure successful completion of the project.
2. **Understand approval procedures to ensure effective flow of information in the construction process.**

   **AC-CST 2.1:** Identify the components necessary for developing submittal approval procedures system.
   *Sample Indicators:*
   - No sample indicators

   **AC-CST 2.2:** Employ procedures that complete submittal approval process related to shop drawings.
   *Sample Indicators:*
   - No sample indicators

   **AC-CST 2.3:** Employ procedures that complete submittal approval process related to state and local permits.
   *Sample Indicators:*
   - No sample indicators

3. **Understand and implement testing and inspection procedures to ensure successful completion of a construction project.**

   **AC-CST 3.1:** List testing and inspection procedures related to specific areas.
   *Sample Indicators:*
   - No sample indicators

   **AC-CST 3.2:** Interpret guides designed for testing and inspection purposes in specific areas.
   *Sample Indicators:*
   - No sample indicators

   **AC-CST 3.3:** Explain the benefits of using an external contractor to conduct the testing and inspection on the different phases of a build project.
   *Sample Indicators:*
   - No sample indicators

4. **Understand the purpose of scheduling as it relates to the successful completion of a construction project.**

   **AC-CST 4.1:** Develop a schedule for a specific project.
   *Sample Indicators:*
   - No sample indicators
AC-CST 4.2: Explain rationale for a specific scheduling procedure.
Sample Indicators:
- No sample indicators

AC-CST 4.3: Describe the relationship between scheduling, risk assessment, and cost estimating to the success of the project.
Sample Indicators:
- No sample indicators

5. Understand and apply practices and procedures required to maintain jobsite safety.

AC-CST 5.1: Determine procedures for a jobsite safety program.
Sample Indicators:
- Incorporate the procedures into the design of a safety program.

AC-CST 5.2: Explain the importance of workers being OSHA-certified.
Sample Indicators:
- No Sample Indicators.

AC-CST 5.3: Identify universal signs and symbols, such as colors, flags, stakes, and hand signals that apply to construction worksite situations.
Sample Indicators:
- Explain functions of signs and symbols.
- Inspect all signs and symbols for safe and proper use.

AC-CST 5.4: Explain the need for jobsite security to prevent liability
Sample Indicators:
- No Sample Indicators

AC-CST 5.5: Determine the components necessary to ensure environmental safety on the jobsite.
Sample Indicators:
- No Sample Indicators

6. Manage relationships with internal and external parties to successfully complete construction projects.

AC-CST 6.1: Describe strategies used to promote collaboration, trust and clear communication among contractors, suppliers, clients and others on a jobsite.
Sample Indicators:
- No Sample Indicators
7. **Compare and contrast the building systems and components.**

   **AC-CST 7.1:** Identify building systems needed to complete a construction project.
   
   *Sample Indicators:*
   
   - List all building systems involved in a project.
   - Describe the purpose of each system.
   - List all components of the involved building system.
   - Describe the function of each component.

   **AC-CST 7.2:** Identify components of building systems needed to complete a project.
   
   *Sample Indicators:*
   
   - No Sample Indicators.

   **AC-CST 7.3:** Incorporate appropriate building systems into a construction project
   
   *Sample Indicators:*
   
   - No Sample Indicators.

8. **Demonstrate the construction crafts required for each phase of a given project.**

   **AC-CST 8.1:** Utilize skills to maintain tools, machinery, equipment and construction resources.
   
   *Sample Indicators:*
   
   - No Sample Indicators.

9. **Safely use and maintain appropriate tools, machinery, equipment, and resources to accomplish construction project goals.**

   **AC-CST 9.1:** Select tools, machinery, equipment, and supplies that match project requirements.
   
   *Sample Indicators:*
   
   - Use tools, machinery, and equipment according to industry standards.
   - Properly maintain tools, machines, and equipment in a safe manner.

   **AC-CST 9.2:** Identify sources of information about state-of-the-art tools, machinery, equipment, materials, construction technologies.
   
   *Sample Indicators:*
   
   - No Sample Indicators.

   **AC-CST 9.3:** Demonstrate use of tools, machinery, equipment, and other resources commonly used in design and construction.
   
   *Sample Indicators:*
   
   - No Sample Indicators.
Design/Pre-Construction Pathway (AC-DES)

1. **Justify design solutions through the use of research documentation and analysis of data.**

   **AC-DES 1.1:** Use available research methods when project planning and problem-solving.
   
   *Sample Indicators:*
   - Select and employ the proper method for a given project.

   **AC-DES 1.2:** Provide appropriate precedents for development of a project.
   
   *Sample Indicators:*
   - Articulate logical rationale for use of chosen precedents.

   **AC-DES 1.3:** Utilize the ability to locate, organize, analyze, apply, and communicate information from multiple sources and perspectives.
   
   *Sample Indicators:*
   - No Sample Indicators.

2. **Use effective communication skills and strategies (listening, speaking, reading, writing, and graphic communications) to work with clients and colleagues.**

   **AC-DES 2.1:** Employ facilitation skills while leading meetings that involve a variety of clients and agencies.
   
   *Sample Indicators:*
   - Identify types of client/agency needs.
   - Mediate diversity to meet needs.

   **AC-DES 2.2:** Employ appropriate representational media to communicate concepts and design.
   
   *Sample Indicators:*
   - Deliver a presentation that explains a concept of design or preconstruction.
   - Show project plans for visual impact.
   - Evaluate customer comprehension.

3. **Understand the integral systems that impact the design of buildings and structures.**

   **AC-DES 3.1:** Describe building systems and their interrelationships.
   
   *Sample Indicators:*
   - Select and integrate building systems.

   **AC-DES 3.2:** Develop design criteria for building systems in a given scenario.
   
   *Sample Indicators:*
   - No Sample Indicators
AC-DES 3.3: Evaluate primary building systems including structure, structural engineering concepts, and environmental systems that are integrated within the building project.

Sample Indicators:
- No Sample Indicators

AC-DES 3.4: Apply suitable practices of environmental impact to enhance project acceptance and quality.

Sample Indicators:
- Integrate sustainable design principles across planning, design, and construction

4. Apply building code, laws, and rules in the design and construction of projects.

AC-DES 4.1: Explain how the Americans with Disabilities Act influences the compliance requirements for project designs.

Sample Indicators:
- Integrate Americans with Disabilities Act compliance into project designs.

AC-DES 4.2: Design project plans that comply with OSHA standards.

Sample Indicators:
- Demonstrate comprehensive knowledge and application of OSHA Standards.

5. Identify the diversity of needs, values, and social patterns in project design, including accessibility standards, to appropriately meet client needs.

AC-DES 5.1: Identify the geographic and cultural issues related to project design in a given situation.

Sample Indicators:
- Apply cultural traditions and diversity to project design.

AC-DES 5.2: Participate in appropriate trade and professional associations.

Sample Indicators:
- No Sample Indicators.

AC-DES 5.3: Identify the diverse roles that utilize individual talents when working as members of a team.

Sample Indicators:
- No Sample Indicators.

6. Apply the techniques and skills of modern drafting, design, engineering, and construction to projects.

AC-DES 6.1: Apply basic organizational, spatial, structural, and constructional principles to the design of interior and exterior space to produce an effective design.

Sample Indicators:
• Develop design alternatives that address a given problem.
• Evaluate and select the best solution.

AC-DES 6.2: Read and produce technical drawings, understanding the significance of each line in a drawing.
Sample Indicators:
• No Sample Indicators.

AC-DES 6.3: Use communication skills and strategies to work effectively with people (including clients, team members, and others) to identify design/construction requirements.
Sample Indicators:
• Develop technical drawings drafted by hand and computer-generated plans to design structures that meet the client’s specifications.
• Draw and sketch by hand to communicate ideas effectively.

7. Employ appropriate representational media to communicate concepts and design.

AC-DES 7.1: Convey graphic information using multi-dimensional drawings.
Sample Indicators:
• Employ basic drawing skills.
• Conceptualize a three-dimensional form from a two-dimensional drawing to visualize proposed work.
• Build three-dimensional form models.

AC-DES 7.2: Build models using referenced drawings and sketches.
Sample Indicators:
• Employ basic model building techniques.
• Verify accuracy of model based on drawings and sketches used.

AC-DES 7.3: Utilize computer technology when communicating concepts and designs.
Sample Indicators:
• Employ basic computer modeling techniques.

8. Apply principles, conventions, standards, applications, and restrictions pertaining to the selection and use of construction materials, components and assemblies for project design.

AC-DES 8.1: Select building materials and assemblies upon evaluation that meet project specifications.
Sample Indicators:
• Develop and communicate an assigned building assembly.
• Apply mathematical skills to estimate the cost of the materials and supplies.
AC-DES 8.2: Use appropriate combinations of building materials and components that satisfy the requirements of building programs.
*Sample Indicators:*
- Select the more appropriate building assembly.

**Maintenance/Operation Pathway (AC-MO)**

1. **Recognize and employ universal construction signs and symbols to function safely in the workplace.**

   **AC-MO 1.1:** Select the most appropriate sign or symbol to use upon analysis of a given workplace situation.
   *Sample Indicators:*
   - No Sample Indicators

   **AC-MO 1.2:** Identify universal signs and symbols such as colors, flags, stakes, and hand signals that apply to construction workplace situations.
   *Sample Indicators:*
   - Explain functions of signs and symbols.
   - Work safely using signs and symbols.
   - Inspect all signs and symbols for safe and proper use.
   - Use proper signs and symbols for the work area.

2. **Use troubleshooting procedures when solving a maintenance problem to maintain buildings and structures.**

   **AC-MO 2.1:** Isolate a maintenance problem using troubleshooting procedures.
   *Sample Indicators:*
   - Identify the problem using at least one appropriate troubleshooting method.
   - Communicate problem and course of action to others.

   **AC-MO 2.2:** Select a solution that addresses an identified maintenance problem.
   *Sample Indicators:*
   - Identify strategies for implementing the solution.
   - Identify tools and equipment needed.

   **AC-MO 2.3:** Implement a solution using required strategies, tools, and equipment.
   *Sample Indicators:*
   - Use tools and equipment safely, effectively, and efficiently.
   - Test and verify that the problem is solved.
3. Apply construction skills when repairing, restoring or renovating existing structures.

**AC-MO 3.1:** Determine materials required to complete restoration.
*Sample Indicators:*
- Match materials selected to the restoration specifications.

**AC-MO 3.2:** Implement strategies that produce a restored structure.
*Sample Indicators:*
- Restore structure to match original structure within specifications.

**AC-MO 3.3:** Develop solutions to restoration problems upon evaluation.
*Sample Indicators:*
- Identify strategies for implementing solutions.

4. Determine work required to repair or renovate an existing building or structure.

**AC-MO 4.1:** Complete required repair work that restores project to original condition.
*Sample Indicators:*
- Use tools and materials safely, effectively, and efficiently
- Test and verify that the repair is complete.

**AC-MO 4.2:** Apply evaluation strategies that assess the extent and condition of a structural problem.
*Sample Indicators:*
- Identify potential sources of problems.
- Select the most probable cause of each problem.

**AC-MO 4.3:** Identify tools, materials, and human resources needed to repair work.
*Sample Indicators:*
- Select tools and materials that will repair the problem effectively and efficiently.
- Employ individuals with the appropriate expertise to complete the repair work.

5. Plan and practice preventative maintenance activities to service existing structures.

**AC-MO 5.1:** Develop a checklist to track preventative maintenance.
*Sample Indicators:*
- Read and interpret technical manuals.
- Identify preventative maintenance needs for a variety of conditions.
- List maintenance needs for a variety of equipment, systems, and structures.

**AC-MO 5.2:** Identify tools and materials needed to perform preventative maintenance.
*Sample Indicators:*
- Select and use tools and materials safely, effectively, and efficiently.
AC-MO 5.3: Establish time-based schedules to perform preventative maintenance.

*Sample Indicators:*
- Follow a maintenance schedule.
- Complete and maintain preventative maintenance records.

6. Maintain and inspect building systems to achieve safe and efficient operation of facilities.

AC-MO 6.1: Use maintenance and inspection strategies on fire prevention, HBAX, security/alarm, environmental, and process systems according to safety, code, and customer requirements.

*Sample Indicators:*
- Read and interpret technical manuals.
- Apply information from technical manuals.

AC-MO 6.2: Describe the processes/procedures used to maintain facility operation systems.

*Sample Indicators:*
- No Sample Indicators.

AC-MO 6.3: Participate in appropriate training activities to learn new or improved maintenance/operations strategies.

*Sample Indicators:*
- No Sample Indicators.