ARCHITECTURE & ENGINEERING CAREER PATHWAY (AE)

The **Architecture & Engineering Career Pathway (AE)** prepares learners for technical drafting, architectural design support, mechanical modeling, engineering documentation, and production-support roles that contribute to the planning, design, modeling, coordination, and optimization of built and industrial systems. Instruction emphasizes applied CAD and CAM skills, engineering documentation standards, materials awareness, systems coordination, and production-ready drawing development.

The pathway consists of two technical specialization tracks and one advanced track. Learners may complete either technical track based on career goals and may progress into the advanced track upon successful completion of a technical certificate or documented equivalent experience.

SOC CODES

17-3000 — Drafters, Engineering Technicians, and Mapping Technicians
17-3011 — Architectural & Civil Drafters
17-3013 — Mechanical Drafters
17-3026 — Industrial Engineering Technologists & Technicians
17-3027 — Mechanical Engineering Technologists & Technicians
11-3051 — Industrial Production Managers

AE CAREER PATHWAY CERTIFICATES

ARCHITECTURAL DRAFTING & DESIGN (TECHNICAL TRACK)

This certificate prepares learners for entry-level architectural drafting and building design support roles within residential and commercial construction environments. Training emphasizes 2D drafting, technical drawing standards, BIM fundamentals, construction documentation development, and coordinated design workflows.

Learners develop the skills necessary to produce accurate technical drawings, interpret architectural plans, support document revisions, and assist architects and engineers in structured project environments.

SOC CODES

17-3000 — Drafters, Engineering Technicians, and Mapping Technicians
17-3011 — Architectural & Civil Drafters

CORE COURSES

AE 101 — Engineering & Design Workflows Foundations
AE 102 — Technical Communication & Documentation Standards
AE 103 — Professional Practice for Technical Teams: Safety, Ethics & Collaboration

OCCUPATIONAL COURSES

AE 201 — CAD Drafting & Engineering Graphics Fundamentals
AE 202 — Technical Drawing Standards
AE 203 — BIM & Construction Documentation
AE 209 — Residential & Commercial Design Studio

INDUSTRY CREDENTIAL

OSHA 10-Hour Construction Industry
**Conducted over two (2) scheduled in-person training days*

MECHANICAL DESIGN & 3D MODELING (TECHNICAL TRACK)

This certificate prepares learners for mechanical drafting and mechanical engineering technologist support roles within manufacturing and industrial environments. Training emphasizes parametric modeling, part and assembly development, bill of materials creation, production documentation, and digital fabrication awareness.

Learners develop the competencies required to support engineers, generate mechanical drawings, coordinate assemblies, and assist with model-to-production workflows. All coursework is delivered 100% online and project based.

SOC CODES

17-3013 — Mechanical Drafters
17-3027 — Mechanical Engineering Technologists & Technicians

CORE COURSES

AE 101 — Engineering & Design Workflows Foundations
AE 102 — Technical Communication & Documentation Standards
AE 103 — Professional Practice for Technical Teams: Safety, Ethics & Collaboration

OCCUPATIONAL COURSES

AE 204 — Fundamentals of 3D Mechanical Design
AE 205 — Parametric Modeling Fundamentals
AE 206 — Part & Assembly Design: Constraints, Motion, & BOM Development
AE 210 — Design for Manufacturing & Digital Fabrication Fundamentals

INDUSTRY CREDENTIAL

OSHA 10-Hour General Industry
**Conducted over two (2) scheduled in-person training days*

ENGINEERING & INDUSTRIAL OPERATIONS LEADERSHIP (ADVANCED TRACK)

This advanced certificate integrates technical drafting literacy, parametric modeling awareness, production systems knowledge, quality systems application, workflow optimization, and foundational supervisory competencies. The program bridges technical execution with operational coordination responsibilities within structured industrial and manufacturing environments.

Learners develop applied competencies in production planning, resource coordination, cost-awareness, documentation control, process monitoring, team communication, and data-informed decision-making. Emphasis is placed on strengthening the transition from technical contributor to operational support and entry-level supervisory roles in engineering and production settings. All coursework is delivered 100% online and project based.

SOC CODES

17-3026 — Industrial Engineering Technologists & Technicians
17-3027 — Mechanical Engineering Technologists & Technicians

ADVANCEMENT OCCUPATION (WITH EXPERIENCE):

11-3051 — Industrial Production Managers

PREREQUISITE
Completion of one (1) Technical Track Certificate OR documented equivalent technical experience. Resume experience verification required. Supplemental manufacturing or modeling competency modules may be required based on applicant background.

OCCUPATIONAL COURSES
AE 207 — Project Coordination for Technical Teams
AE 208 — Materials Estimating, Loads & Mechanical Systems Fundamentals
AE 210 — Design for Manufacturing & Digital Fabrication Fundamentals
AE 211 — Production Systems & Workflow Optimization
AE 212 — Quality Systems & Technical Process Control

ENTRY-LEVEL MANAGEMENT COURSES
AE 213 — Production Planning & Operations Coordination
AE 214 — Industrial Supervision & Performance Management Fundamentals

INDUSTRY CREDENTIAL (SELECT ONE)
OSHA 30-Hour General Industry
OSHA 30-Hour Construction Industry
**OSHA training includes a required four (4) day in-person session*

AE CORE COURSES

AE 101 — Engineering & Design Workflows Foundations

This course introduces how architectural and mechanical design projects progress from concept development through drafting, modeling, review, approval, and production release. Emphasis is placed on workflow sequencing, interdisciplinary coordination, documentation control, and quality checkpoints within technical environments.

Upon successful completion, the trainee will be able to:
• Explain how design progresses from concept to production documentation
• Describe standard design review and approval workflows
• Identify roles and responsibilities within engineering teams
• Apply documentation control principles to support coordination and quality

AE 102 — Technical Communication & Documentation Standards

This course develops professional communication and documentation practices used in architectural and engineering environments. Emphasis is placed on technical writing, drawing notation, file organization, revision control, and standards alignment to ensure clarity and traceability.

Upon successful completion, the trainee will be able to:
• Produce technical documents using industry-standard formats
• Apply document control and revision tracking practices
• Communicate technical information across disciplines
• Interpret and apply drawing and documentation standards

AE 103 — Professional Practice for Technical Teams: Safety, Ethics & Collaboration

This course examines professional expectations within technical design and production-support roles. Topics include workplace safety awareness, ethical responsibility, communication practices, and collaborative workflow standards.

Upon successful completion, the trainee will be able to:

• Recognize workplace safety responsibilities in technical environments
• Apply ethical decision-making principles
• Demonstrate effective teamwork and professional conduct
• Identify issues requiring escalation within structured workflows

AE OCCUPATIONAL COURSES

AE 201 — CAD Drafting & Engineering Graphics Fundamentals

This course develops foundational 2D drafting skills used in architectural and engineering environments. Trainees create accurate technical drawings using layers, dimensions, annotations, orthographic projection, and standard drafting conventions.

Upon successful completion, the trainee will be able to:

• Produce accurate 2D CAD drawings
• Apply layers, dimensions, and annotations correctly
• Interpret architectural and mechanical drawings
• Follow established drafting standards

AE 202 — Technical Drawing Standards

This course focuses on drawing standards, notation systems, and geometric dimensioning and tolerancing (GD&T) principles used across engineering disciplines. Emphasis is placed on producing compliant and production-ready documentation.

Upon successful completion, the trainee will be able to:

• Apply industry-standard symbols and notation
• Interpret tolerances and dimensioning practices
• Identify drafting inconsistencies
• Prepare drawings that meet documentation standards

AE 203 — BIM & Construction Documentation

This course introduces concepts of Building Information Modeling (BIM) and construction documentation workflows. Trainees develop basic 3D building models and extract coordinated drawing sets aligned with structured documentation practices.

Upon successful completion, the trainee will be able to:

• Explain BIM’s role in project coordination
• Develop basic 3D building models
• Identify components of construction document sets
• Support model-to-drawing documentation workflows

AE 204 — Fundamentals of 3D Mechanical Design

This fully online, project-based course develops foundational skills in parametric 3D mechanical modeling. Trainees create parts and assemblies while applying design intent, constraints, and structured modeling practices used in manufacturing environments.

Upon successful completion, the trainee will be able to:

- Create fully defined 3D mechanical parts
- Develop assemblies using mechanical constraints
- Generate production-ready drawings
- Modify models to support design revisions

AE 205 — Parametric Modeling & Integrated CAD/CAM Fundamentals

This course introduces integrated modeling workflows that connect digital design to fabrication planning. Trainees develop parametric models and examine toolpath awareness and manufacturing considerations within a digital environment.

Upon successful completion, the trainee will be able to:

- Create parametric 3D models
- Apply integrated CAD/CAM workflow concepts
- Evaluate manufacturing considerations during design
- Support iterative design revisions

AE 206 — Part & Assembly Design: Constraints, Motion & BOM Development

This course focuses on advanced assembly modeling, motion relationships, exploded views, and bill of materials development. Emphasis is placed on coordination practices that support fabrication and production documentation.

Upon successful completion, the trainee will be able to:

- Apply assembly constraints and relationships
- Simulate basic mechanical motion
- Generate exploded views
- Develop bills of materials for production use

AE 207 — Project Coordination for Technical Teams

This course develops workflow coordination and documentation tracking skills used in engineering and production environments. Emphasis is placed on task sequencing, revision tracking, and cross-disciplinary communication.

Upon successful completion, the trainee will be able to:

- Support documentation tracking processes
- Monitor revision and update workflows
- Communicate technical updates across teams
- Assist with project coordination procedures

AE 208 — Materials Estimating, Loads & Mechanical Systems Fundamentals

This course provides a practical overview of engineering materials, load behavior, and mechanical system fundamentals used in built and industrial environments. Emphasis is placed on applied understanding rather than advanced theoretical analysis.

Upon successful completion, the trainee will be able to:
• Identify common engineering materials and properties
• Explain basic load, stress, and force concepts
• Perform foundational materials estimating calculations
• Relate material and load considerations to design decisions

AE 209 — Residential & Commercial Design Studio

This applied design course integrates drafting and modeling skills to develop coordinated residential and commercial layouts. Trainees produce floor plans, elevations, and structured documentation sets aligned with industry practices.

Upon successful completion, the trainee will be able to:
• Develop residential and commercial floor plans
• Create elevations and layout drawings
• Apply spatial planning principles
• Produce coordinated drawing packages

AE 210 — Design for Manufacturing & Digital Fabrication Fundamentals

This course develops practical understanding of how digital models transition into production workflows. Emphasis is placed on design-for-manufacturing principles, fabrication constraints, material considerations, and prototype iteration processes.

Upon successful completion, the trainee will be able to:
• Evaluate manufacturability of mechanical designs
• Identify fabrication and tooling considerations
• Apply digital fabrication workflow concepts
• Support prototype development and revision cycles

AE 211 — Productivity Systems & Workflow Optimization

This course introduces structured production systems, workflow mapping, and operational efficiency principles used in manufacturing and industrial environments. Emphasis is placed on process flow analysis, resource coordination, throughput awareness, bottleneck identification, and continuous improvement strategies that support organized production systems.

Upon successful completion, the trainee will be able to:
• Analyze production workflows using basic process-mapping tools
• Identify bottlenecks and inefficiencies within structured operations
• Apply workflow optimization principles to improve production flow
• Evaluate resource utilization and throughput considerations
• Support continuous improvement initiatives within production environments

AE 212 — Quality Systems & Technical Process Control

This course examines quality control systems and process monitoring practices used in engineering and manufacturing settings. Topics include quality standards awareness, inspection procedures, documentation control, corrective action processes, and performance measurement fundamentals that ensure consistency and reliability in production environments.

Upon successful completion, the trainee will be able to:
• Explain foundational quality system principles used in industrial environments
• Interpret quality documentation and inspection requirements
• Apply basic process control and monitoring concepts
• Identify nonconformance issues and corrective action procedures
• Support structured quality assurance and compliance workflows

AE ENTRY-LEVEL MANAGEMENT COURSES

AE 213 — Production Planning & Operations Coordination

This course introduces production planning fundamentals and operational coordination practices used in industrial environments. Emphasis is placed on scheduling concepts, capacity awareness, resource allocation, workflow sequencing, and coordination between technical teams and production personnel.

Upon successful completion, the trainee will be able to:
• Explain basic production scheduling and capacity planning concepts
• Support coordination between engineering and production teams
• Analyze workflow sequencing for operational efficiency
• Evaluate resource allocation considerations within production systems
• Contribute to structured operational planning discussions

AE 214 — Industrial Supervision & Performance Management Fundamentals

This course develops foundational supervisory competencies and performance management awareness within industrial environments. Topics include team communication, production metrics, cost awareness, safety-performance integration, and leadership responsibilities in structured operational settings.

Upon successful completion, the trainee will be able to:
• Demonstrate effective communication practices in supervisory contexts
• Interpret production performance metrics and key indicators
• Explain cost drivers and operational performance considerations
• Apply structured decision-making principles in team environments
• Recognize leadership responsibilities within industrial operations