

Construction Pathways Proposed Course Revisions

Dear Teachers,

Thank you for providing your expertise as we finalize courses based on the revised construction standards. Without your input, we could not provide the high-quality courses and instruction that allows our students to be job ready as they enter the workforce. Most courses received only minor changes, but the courses listed below were modified to alter overall content based on industry feedback during the standards revision process.

The following pages reflect changes to the following courses:

DD 178004 Structural Coverings and Finishes

DF 178019 Plan Reading

DF 178022 Construction Management

DF 178024 Facility and Building Maintenance

DF 178027 Construction Site Preparation

DF 178028 Interior Design

Potential courses to be removed based on industry feedback – relevant competencies absorbed into other courses.

DE 178015 Telecommunications Low Voltage Systems (Absorb into DE 178007 Construction Electrical Systems, DE 178009 Commercial and Industrial Construction Electrical Systems)

DF 178025 Custodial Services (absorb into DF 178024 Building and Facility Maintenance)

Please review each of the course changes and complete the survey. Only modified sections of the course are listed. Added competencies or title/text descriptions are highlighted green and removed competencies are highlighted in red.

For each course select Agree/Disagree for each course and provide any comments in the provided text box. Thanks again for your time and expertise! If you have any questions or concerns, please contact:

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DD 178004 Structural Coverings and Finishes

Reason for Changes: Design competencies do not align with course description.

Remove Planning and Design Competencies (7.1.1-7.1.8)

Course Description:

This course will address applications of interior and exterior finish work. Students will identify material properties and select for appropriate application. Students will install thermal and moisture protection including roofing, siding, fascia and soffits, gutters, and louvers. Students will install drywall; trim-joinery and molding and apply wall, floor and ceiling coverings and finishes. Throughout the course, the safe handling of materials, personal safety, prevention of accidents and the mitigation of hazards are emphasized.

Strand 7. Planning and Design

Learners apply principles of architectural and civil engineering, drawing and construction with current technology to develop, present and use construction proposals, plans and schematics. Knowledge and skill may be applied throughout the project from preconstruction design through all stages of building in residential, commercial and industrial applications.

Outcome 7.1. Proposals

Develop and present a design, proposal, or concept.

Competencies

- 7.1.1 Differentiate between residential, commercial, industrial, infrastructure, and institutional construction segments.
- 7.1.2. Collect and analyze data to identify required deliverables (e.g., reports, studies, building designs, drawings) based on client specifications.
- 7.1.4. Create a visualization of a proposed project using data from relevant materials according to client specifications and in compliance with building codes.
- 7.1.5. Incorporate building structural systems, environmental systems, safety systems, building envelope systems and building service systems into the design.
- 7.1.6 Incorporate sustainable design and construction techniques.
- 7.1.7. Incorporate the Americans with Disabilities Act (ADA) Standards for Accessible Design.
- 7.1.8. Develop and present the comprehensive proposal.

DF 178019 Plan Reading and Estimating

Reason for Changes: Industry stated need for estimating skills.

Add 'and Estimating' to title.

Add 'and develop an estimate of material, time, personnel, and equipment needs, availability, and cost'

Add listed competencies (6.2.5-6.2.9;6.3.1-6.3.4):

Course Description:

Students learn blueprint reading as it relates to the architecture and construction. Students will use scaling, orthographic projections, dimensioning practices, symbols, notations, and abbreviations to perform area calculations and to interpret floor plan, section, and elevations and develop an estimate of material, time, personnel, and equipment needs, availability, and cost. Using construction plans, students will identify problems or shortcomings related to the layout and installation of materials for the project.

- 6.2.5. Describe various building sections, wall sections and other architectural details of residential, commercial, utility, and highway construction.
- 6.2.6. Identify and interpret aspects of sustainable design and construction techniques in construction drawings and specifications.
- 6.2.7. Identify and interpret aspects of the Americans with Disabilities Act (ADA) in construction drawings and specifications.
- 6.2.8. Read and interpret various 3-D and other Computer Aided Design (CAD) generated views in construction drawings.
- 6.2.9. Read and interpret various Building Information Modeling (BIM) generated views in construction drawings.

Outcome 6.3. Construction Estimating

Develop an estimate of material, time, personnel, and equipment needs, availability, and cost for various construction types.

Competencies

- 6.3.1. Complete a site inventory and analysis, including the physical conditions, code, and utilities requirements and the environmental impact.
- 6.3.2. Identify necessary material, time, personnel, and equipment to be used in construction projects.
- 6.3.3. Calculate cost of identified materials, time, personnel and equipment to be used in construction projects.
- 6.3.4. Develop a program list including intended use, budget, economics, customer wants and needs, and maintenance.

DF 178022 Construction Management

Reason for Changes: Competencies were missing to align to course description. Industry stated need for estimating skills.

Add competencies (6.2.1-6.2.4;6.3.1-6.3.4) to better align to course description.

Course Description:

This course provides an integrated look at balancing the planning, estimating, and directing of construction operations. Students learn the process of creating and monitoring a construction project including standard agreements, bidding, estimates and project schedules. Students will learn to manage change orders, accident prevention and loss control, closeouts, and claims with an emphasis in production and quality control. Additionally, students will apply leadership, communications, and problem solving skills to construction management.

Outcome 6.2. Construction Drawings

Read and interpret plans and diagrams within a construction drawing set (i.e., topographical, grading and drainage, architectural, structural, plumbing, mechanical, electrical) to organize a project work sequence.

Competencies

- 6.2.1. Collect and analyze project information to determine resources and tasks required to complete a project.
- 6.2.2. Read and interpret a site plan.
- 6.2.3. Use architect's and engineer's scales to read and interpret construction drawings for material calculations and installation at the jobsite.
- 6.2.4. Read, interpret, and organize construction drawings, models, specifications and other contractual documents.

Outcome 6.3. Construction Estimating

Develop an estimate of material, time, personnel, and equipment needs, availability, and cost for various construction types.

Competencies

- 6.3.1. Complete a site inventory and analysis, including the physical conditions, code, and utilities requirements and the environmental impact.
- 6.3.2. Identify necessary material, time, personnel, and equipment to be used in construction projects.
- 6.3.3. Calculate cost of identified materials, time, personnel and equipment to be used in construction projects.
- 6.3.4. Develop a program list including intended use, budget, economics, customer wants and needs, and maintenance.

DD 178024 Facility and Building Maintenance

Reason for Changes: Custodial Services course will be eliminated; these competencies were validated by industry and this course was the appropriate fit.

Add competencies (6.6.1-6.6.4;6.6.7-6.6.9;6.6.12-6.6.16)

Course Description:

Students are introduced to the maintenance and management processes used in public buildings and industrial facilities. Students will troubleshoot building and systems issues and provide solutions following applicable procedures and standards. Students will operate and maintain machinery and equipment used in grounds and facilities maintenance tasks. Throughout the course, the safe handling of materials, personal safety, prevention of accidents and the mitigation of hazards are emphasized.

Outcome 6.6. Building Maintenance

Provide maintenance, repair and renovations to maintain the long-term conservation and protection of facility buildings and grounds.

Competencies

- 6.6.1. Identify types of surface material (porous/nonporous) to determine processes and chemicals needed to clean and maintain floors using manufacturers' recommendations.
- 6.6.2. Identify type of carpet (e.g., fibers, styles, construction methods) and associated processes and procedures used for cleaning.
- 6.6.3. Perform interim maintenance used in extending the life of the floor surfaces and coverings.
- 6.6.4. Identify hard, resilient, and wood floor coverings and use procedures (e.g., scrubbing, stripping, buffing, high-speed burnishing, screening, sealing), chemicals and equipment needed to maintain and extend the life of the flooring.
- 6.6.5. Describe sustainable, healthy, and high-performance cleaning.
- 6.6.6. Develop and implement a custodial care plan (i.e., custodial duties and frequency; routine, renovation, supervisory, management activities) that provides a safe and healthy environment for a facility and analyzes efficiency based on hours and square footage.
- 6.6.7. Select procedures and processes needed to clean, disinfect and maintain wall surfaces (e.g., painted, tiled, papered, plastered).
- 6.6.8. Clean and disinfect lavatories and kitchen in accordance with health and safety guidelines.
- 6.6.9. Replenish consumable supplies and maintain levels of inventory.
- 6.6.10. Collect and dispose solid and hazardous waste in accordance with local codes and green initiatives.
- 6.6.11. Develop a green cleaning program that identifies cleaning procedures, services, equipment, and supplies that provide improvements in ergonomics and reduce the effect on human health without harming the environment.
- 6.6.12. Schedule preventative maintenance, repair, and renovation to maintain a safe and healthy environment using computer-aided facilities management programs as appropriate.
- 6.6.13. Develop and implement a waste management and recycling plan that reduces costs based on local codes and regulations.
- 6.6.14. Develop and implement an integrated pest management plan that reduces environmental impact and reduces cost.
- 6.6.15. Identify the need for a water and energy conservation and management plan.
- 6.6.16. Compare and contrast green and traditional practices in the selection of materials, chemicals and equipment.

DF 178027 Construction Site **Surveying and Logistics**

Reason for Change: Competencies are necessary to accomplish course description. Drafting competency did not align.

Add 'Surveying and Logistics' to course title.

Add competencies (3.3.9-3.3.10;3.3.12;3.4.1-3.4.9;6.4.3-6.4.4;6.5.4-6.5.5) and remove (7.3.1)

Course Description:

Students use surveying, topographic, satellite positioning, and geomatic instruments to locate and prepare a site for construction. Students establish lot and building lines as well as grade levels, and use site plans and elevation drawings to determine excavation needs. Students locate and mark underground and overhead services, identify soil conditions that may require shoring and position batter boards. Additionally, students identify the parameters for site selection, zoning regulations, and the process for filing building permits.

Outcome 3.3. Excavation

Perform excavation activities from clearing and grubbing to finish grading in accordance with excavation specifications on prints and in local building codes.

Competencies

- 3.3.9. Explain the types of grade (e.g., subgrade, finished grade).
- 3.3.10. Identify the types of stakes and describe their functions.
- 3.3.12. Lay out stakes in sequence and set grade.

Outcome 3.4. Geographic Information Systems (GIS)

Employ GIS computer applications to interpret data, maps and land use.

Competencies

- 3.4.1. Interpret and evaluate the accuracy of digital imagery and aerial photography.
- 3.4.2. Explain map projections and the use of scales.
- 3.4.3. Describe GIS data structures (e.g., vector, grid, triangulated irregular network [TIN]).
- 3.4.4. Explain digital elevation methods (e.g., digital elevation model [DEM], global positioning system [GPS]).
- 3.4.5. Interpret spatial interpolation and two- and three-dimensional functional spatial analyses.
- 3.4.6. Demonstrate ranging methods.
- 3.4.7. Identify sources of errors in GIS and formulate corrections and solutions.
- 3.4.8. Determine one's position on the earth using GPS.
- 3.4.9. Integrate GPS data into GIS applications.

Outcome 6.4. Construction Scheduling

Organize material and equipment delivery to maximize productivity.

Competencies

- 6.4.1. Describe the schedule of labor, delivery of materials/equipment and the effect on employer cash flow and construction economics.
- 6.4.2. Prescribe material and equipment storage needs and location on different types of job sites

(e.g., access, delivery, protection from the elements, security).

6.4.3. Create a schedule of construction and installation.

6.4.4. Prepare and process unused material inventory for return credit.

Outcome 6.5. Field Organization

Summarize the sequence of building stages, systems quality control, and inspection processes within a build environment.

Competencies

6.5.1. Identify the Critical Path Method (CPM) to select and sequence the appropriate building stages and explain their relationships in completing a construction project.

6.5.2. Identify the various material testing techniques (e.g., hardness, tensile strength, bearing capacity, wear resistance, and soil tests).

6.5.4. Describe the process to a walkthrough and creation of a punchlist to to ensure conformity with plans, specifications and authorized change orders.

6.5.5. Identify a final inspections order to obtain certificate of occupancy.

6.5.7. Identify the roles and goals of construction professionals within a given delivery system (e.g., owners, architects, engineers, suppliers, general and trade contractors, consultants, regulators).

Outcome 7.3. Drafting

Design residential, industrial, civil and commercial plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.

Competencies

7.3.1. Construct site plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards, (e.g., zoning, property lines, utilities, building line, setback).

DF 178028 Interior Design and Estimating

Reason for Change: Industry stated need for estimating skills. Competencies to be removed did not align with course description.

Add 'and develop an estimate of material, time, personnel, and equipment needs, availability, and cost.' to course description.

Remove competencies (3.10.4-3.10.12;4.4.9)

Add (6.3.1-6.3.4;7.3.6-7.3.8)

Course Description:

Students learn principles and elements of design as they relate specifically to interior spaces. Students develop functional and aesthetic design concepts with an emphasis in providing design solutions. Students select materials for appropriateness, quality, performance, and cost for interior applications. Students use presentation techniques, technical drawings and other visual materials to enhance and present interior designs **and develop an estimate of material, time, personnel, and equipment needs, availability, and cost.**

Outcome 3.10. Interior Finish Work

Complete interior finish for residential, industrial and commercial facilities.

Competencies

- 3.10.1. Describe the different types and characteristics of drywall and finishing materials.
- 3.10.2. Lay out the drywall installation and nail or screw pattern and install drywall and corner accessories.
- 3.10.3. Describe the effects insulation, vapor barriers and ventilation can have on controlling moisture.
- 3.10.4. Install insulation and vapor barriers for wall and ceiling finishes.
- 3.10.5. Install drywall board.
- 3.10.6. Finish drywall board.
- 3.10.7. Lay out and install alternative methods of ceiling (e.g. acoustic, suspended).
- 3.10.8. Prepare subfloor, install building paper and cut and install underlayment.
- 3.10.9. Lay out and install finished flooring (e.g., vinyl, carpet, wood, ceramic).
- 3.10.10. Install door units (e.g., prehung, double hung, folding, sliding) and door hardware.
- 3.10.11. Install interior door and window trim (e.g., stools, sills, jamb extensions, casing, mullions, aprons).
- 3.10.12. Apply common drywall finishing compounds.
- 3.10.13. Apply finish coatings (e.g., paint, stains, varnishes, texturing, wallpaper).
- 3.10.14. Install cabinetry, shelving and related hardware.

Outcome 4.5. Electrical Wiring

Install above and in-ground wiring in residential, commercial, and industrial settings.

Competencies

- 4.4.9. Install, service, and troubleshoot low-voltage systems (e.g., communication systems, telephone systems, control systems, lighting systems, security systems, fire alarm systems).

Outcome 6.3. Construction Estimating

Develop an estimate of material, time, personnel, and equipment needs, availability, and cost for various construction types.

Competencies

- 6.3.1. Complete a site inventory and analysis, including the physical conditions, code, and utilities requirements and the environmental impact.
- 6.3.2. Identify necessary material, time, personnel, and equipment to be used in construction projects.
- 6.3.3. Calculate cost of identified materials, time, personnel and equipment to be used in construction projects.
- 6.3.4. Develop a program list including intended use, budget, economics, customer wants and needs, and maintenance.

Outcome 7.3. Drafting

Design residential, industrial, civil and commercial plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.

Competencies

- 7.3.1. Construct site plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards, (e.g., zoning, property lines, utilities, building line, setback).
- 7.3.2. Construct scaled orthographic drawings to illustrate floor plans with appropriate adjacencies, traffic patterns, orientation of spaces and section views (e.g., stairway section, wall, cabinet elevations, building corners, elevation) in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.
- 7.3.3. Construct foundation and roof plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.
- 7.3.6. Identify the role of Computer Aided Design (CAD) and Building Information Modeling (BIM) in Construction drafting.
- 7.3.7. Identify the parties involved and the roles each play in the Building Information Modeling (BIM) process from conceptual design through construction completion and into facility management.
- 7.3.8. Describe the Building Information Modeling (BIM) process from conceptual design through construction completion and into facility management.