# Scope & Sequence

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| Course Name: Building Maintenance Technology I **PEIMS Code:** 13005400 | | | **Course Credit:** 2.0  **Course Requirements:** This course is recommended for students in Grades 10-12.  **Prerequisites:** None.  **Recommended Prerequisites:** Principles of Architecture or Principles of Construction. |
| **Course Description:** In Building Maintenance Technology I, students will gain knowledge and skills needed to enter the field of building maintenance as a building maintenance technician or supervisor or secure a foundation for a postsecondary degree in construction management, architecture, or engineering. Students will acquire knowledge and skills in plumbing; electrical; and heating, ventilation, and air conditioning (HVAC) systems. Additionally, students will learn methods for repair and installation of drywall, roof, and insulation systems. | | | |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. | | | |
| **Total Number of Periods**  **Total Number of Minutes**  **Total Number of Hours** | 350 Periods  15,750 Minutes  262.5 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. | |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***  (assumes 45-minute periods)  Total minutes per unit | **TEKS Covered**  **130.44 Knowledge and Skills** | |
| **Unit 1: Employability Skills**  This unit explores the professional standards and employability skills required by business and industry. Students will grow to understand that responsibility, time management, organization, positive attitude, and good character have a large impact on employability and job retention. Students will identify interests, abilities, aptitudes, values, and personality traits as they relate to career planning, to develop a keen understanding of the value and benefit of work, and to differentiate between jobs and careers. | 20 Periods  900 Minutes | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) express ideas and messages to others in a clear, concise, and effective manner, including explaining or conveying written information in a professional comprehensive manner;  (B) compile data using numbers in various formats to solve job-appropriate problems;  (C) demonstrate how to choose the ethical course of action and comply with all applicable rules, laws, and regulations;  (D) demonstrate punctuality, dependability, reliability, and responsibility consistently in reporting for duty and performing assigned tasks as directed; and  (E) evaluate systems and operations; identify causes, problems, patterns, or issues; and explore workable solutions or remedies to improve situations | |
| **Unit 2: Industry Regulations, Compliance, and Workplace Safety**  This unit will expose students to the important compliance, safety standards, and regulations that are implemented within this industry. Students will learn that such practices are in place to manage resources to minimize losses and liabilities to businesses in the industry. Students will determine the role of risk management in the construction industry including, but not limited to, discussions focusing on liability insurance, sanitation, OSHA and EPA regulations, emergency situations, building code, MSDS, and security issues. | 20 Periods  900 Minutes | 2. The student demonstrates knowledge of basic worksite safety regulations and safety guidelines such as in electrical work and carpentry. The student is expected to:  (A) demonstrate safe working procedures during building maintenance and repair;  (B) explain the purpose of the Occupational Safety and Health Administration (OSHA) and how to promote safety on a worksite;  (C) identify worksite hazards and how to avoid or minimize them on a worksite;  (D) explain safety obligations of workers, supervisors, and managers to ensure a safe worksite;  (E) discuss the causes, effects, impacts, and costs of accidents;  (F) define safe work procedures for working with hazardous chemicals;  (G) define proper use of personal protective equipment; and  (H) identify potential construction hazards, including hazardous material exposures, welding, cutting hazards, and confined spaces | |
| **Unit 3: Tools and Equipment**  During this unit students will acquire and apply basic knowledge of using and maintaining professional manufacturing equipment. Students will identify and be able to demonstrate the operation of construction tools and equipment to include, but not limited to, hammers, saws, levels, puller, clamps, drills, grinders, sanders, etc. Demonstrate the professional and safe use of basic tools and equipment used in the building trades. Students will identify specific regulations and maintenance requirements for construction related equipment and tools. | 20 Periods  900 Periods | 4. The student demonstrates how to use hand tools that are commonly used in the worksite such as hammers, saws, levels, pullers, and clamps. The student is expected to:  (A) explain and demonstrate the specific applications and uses of hand tools; and  (B) identify the important safety and maintenance requirements for hand tools  5. The student demonstrates how to use power tools that are commonly used in the worksite such as drills, grinders, saws, and sanders. The student is expect to:  (A) explain and demonstrate appropriately the specific applications and uses of power tools; and  (B) identify the important safety and maintenance requirements for power tools | |
| **Unit 4: Drafting and Design**  Students will differentiate between the different building trades’ plans and specifications. Students will demonstrate the use of the alphabet of lines and read and interpret basic codes. Students will compare differences in symbols and abbreviations between the building trades including electrical, mechanical, and plumbing. Students will read and interpret plans, elevations, schedules, sections, and details contained on basic construction drawings. Students will develop a materials takeoff based on architectural, engineering, and shop drawings. | 25 Periods  1,125 Minutes | 3. The student interprets various types of working drawings as they pertain to commercial construction and becomes familiar with all aspects of commercial construction documents, including architectural, engineering, and shop drawings. The student is expected to:  (A) describe the types of drawings usually included in a set of plans and list the information found on each type;  (B) identify the different types of lines used on blueprint drawings;  (C) identify selected electrical, mechanical, and plumbing symbols commonly used on plans;  (D) identify selected architectural symbols commonly used to present materials on plans;  (E) identify selected abbreviations commonly used on plans;  (F) read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings;  (G) describe the purpose of written specifications;  (H) identify and describe the parts of a **specification; and**  (I) demonstrate how to perform a quantity takeoff for materials | |
| **Unit 5: Framing**  Students will understand that framing systems typically consist of the roof structure that supports the roof deck, exterior and interior load-bearing walls, beams, girders, posts, and floor framing. Students will describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops. Students will identify methods used to secure steel frame systems including where the most critical connections exist, where the roof system connects to supporting walls, where walls connect to each other at floor levels, and where walls connect to the foundation. | 25 Periods  1,125 Minutes | 9. The student gains knowledge of the types and grades of framing materials and the process for installation of metal framing for interior walls, exterior nonbearing walls, and partitions. The student is expected to:  (A) identify and use a system to install a frame wall or partition;  (B) identify the fastening methods used for frame systems; and  (C) identify methods used to secure steel frame systems to supporting structures | |
| **Unit 6: Insulation, Vapor Barriers, and Waterproofing**  Students will summarize basic principles of air leakage and identify typical air leakage sites in walls, floors, and attics.  Students will describe how to stop air leaks utilizing different types of insulation including rigid boards, loose fill, blankets, and foam plastics. Students will explain how to compare insulating materials using the R-value; the higher the R value the better the quality of the insulation. Students will explain the installation and cost of insulation and be able to analyze the amount of insulation to use depends on the geographical area and local utility prices. Students will learn that vapor barriers and house wraps are a critical part of controlling moisture and air flow if selected and installed properly and can help conserve energy, prevent mold growth and maintain the structural integrity. | 25 Periods  1,125 Minutes | 7. The student selects and installs various types of insulation in walls, floors, and attics and becomes familiar with the uses and installation practices for vapor barriers and waterproofing materials. The student is expected to:  (A) demonstrate how to properly remove, replace, and install various types of insulation, including batt, rigid, and blown materials; and  (B) demonstrate how to use and install various vapor barriers and waterproofing materials | |
| **Unit 7: Gypsum Drywall Installation**  Students will gain knowledge about the different types of drywall including square-edged, taper edged, moisture-resistant, foil-backed, fire-resistant, abuse resistant, and soundproof. Students will demonstrate the ability to install drywall in the appropriate order using proper fastening systems including nails, drywall screws, and adhesives. Students will select the type and thickness of drywall required for specific installations and estimate material quantities for the installation. | 25 Periods  1,125 Minutes | 10. The student knows various types of gypsum drywall and their uses and the fastening devices and methods used to install them. The student is expected to:  (A) identify the different types of drywall and their uses;  (B) select the type and thickness of drywall required for specific installations;  (C) explain the fastener schedules for different types of drywall installations;  (D) perform single-layer and multi-layer drywall installations using different types of fastening systems, including nails, drywall screws, and adhesives;  (E) install gypsum drywall on steel studs; and  (F) estimate material quantities for a drywall installation | |
| **Unit 8: Gypsum Drywall Finishing**  Students will be able to identify the materials used for drywall finishing including compounds, joint reinforcing tapes, trim materials, textures, and coatings. Students will demonstrate the use of hand and automatic tools in drywall finishing. Students will compare and contrast between the six levels of drywall finish (0-5) established by industry standards. Students will recognize various types of problems that occur in drywall finishing such as oversanding, screws driven too far, joint issues, etc. Students will be able to problem solve to make proper repairs to drywall finishing problems. | 25 Periods  1,125 Minutes | 11. The student knows the materials, tools, and methods used to finish and patch gypsum drywall. The student is expected to:  (A) describe the differences among the six levels of finish established by industry standards and distinguish a finish level by observation;  (B) identify the hand tools used in drywall finishing and demonstrate the ability to use these tools;  (C) identify the automatic tools used in drywall finishing;  (D) identify the materials used in drywall finishing and describe the purpose and use of each type of material, including compounds, joint reinforcing tapes, trim materials, and textures and coatings;  (E) finish drywall using hand tools;  (F) recognize various types of problems that occur in drywall finishes;  (G) identify the causes and correct method for solving each type of problem that occurs in drywall finishes; and  (H) patch damaged drywall | |
| **Unit 9: Exterior Siding**  Students will demonstrate knowledge of products and materials used in exterior finishing by being able to describe the types and applications of common exterior siding materials including lap and panel siding, fiber-cement siding, wood siding, vinyl and metal siding, stucco, and masonry veneer. Students will demonstrate the ability to install exterior siding through proper measuring, laying-out, cutting, and installation in the appropriate order using necessary fastening systems including nails, screws, and adhesives. | 25 Periods  1,125 Minutes | 8. The student installs various exterior siding materials, including wood, metal, vinyl, and cement board siding. The student is expected to:  (A) demonstrate the proper methods to install exterior finish materials, including wood, metal, vinyl, and cement board siding;  (B) identify various fasteners used to install siding, including nails, screws, and adhesives;  (C) describe the types and applications of stucco and masonry veneer finishes; and  (D) install three types of siding commonly used in the local area | |
| **Unit 10: Metal Doors**  Students will compare and contrast various types of door jambs and frames for different interior doors such as swinging door, bi-fold door, by-pass sliding door, pocket sliding door, etc. Students will demonstrate knowledge and ability to install interior door units and door hardware including verifying the framed door opening for square and plumb before starting the process of installation. Students will interpret a typical door schedule to include door(s), frame(s), glazing, hardware, sizes, configurations, materials, fire resistance ratings, etc. | 25 Periods  1,125 Minutes | 12. The student installs metal doors and related hardware in steel-framed, wood-framed, and masonry walls. The student is expected to:  (A) identify various types of door jambs and frames and demonstrate the installation procedures for placing selected door jambs and frames in different types of interior partitions;  (B) identify types of interior doors;  (C) identify different types of interior door hardware and demonstrate the installation procedures for selected types;  (D) list and identify specific items included on a typical door schedule; and  (E) demonstrate the procedures for placing and hanging a selected door | |
| **Unit 11: Suspended Ceilings**  Identify the different types of suspended ceilings including exposed/lay-in grid, concealed grid, semi-concealed grid, open cell, bespoke metal, etc. Students will demonstrate knowledge and ability to install a suspended ceiling system from a sketch or engineering drawing as well as create a material takeoff from the plans. | 25 Periods  1,125 Minutes | 13. The student gains knowledge of the materials, layouts, and installations of various types of suspended ceilings used in commercial construction as well as ceiling tiles, drywall suspension systems, and pan-type ceilings. The student is expected to:  (A) establish a level line;  (B) explain the common terms related to sound waves and acoustical ceiling materials;  (C) identify the different types of suspended ceilings;  (D) interpret plans related to ceiling layout for a suspended ceiling;  (E) sketch the ceiling layout for a suspended ceiling; and  (F) install selected suspended ceilings | |
| **Unit 12: Trim and Finish Work**  Students will demonstrate knowledge and ability to install window, door, floor, and ceiling trim in the appropriate order using necessary fastening systems including nails, screws, or adhesives. Students will identify the different types of standard moldings such as decorative, casing, crown, chair rail, picture rail, cove, dentil, egg and dart, batten, bead/pearl, etc. and describe their functionality and uses. Students will demonstrate proper and safe use of a miter box and/or miter saw to make square and miter cuts. | 25 Periods  1,125 Minutes | 14. The student knows the various types of trim used in finish work and the proper methods for selecting, cutting, and fastening trim. The student is expected to:  (A) identify the different types of standard moldings and describe their uses;  (B) make square and miter cuts using a miter box or power miter saw;  (C) make coped joint cuts using a coping saw; and  (D) select and use fasteners to install trim, including door trim, window trim, base trim, and ceiling trim | |
| **Unit 13: Floor Coverings**  Students will demonstrate knowledge about different floor coverings including hard (e.g. tile), soft (e.g. carpet), and resilient (e.g. vinyl) types. Students will explore the unique characteristics, advantages, and disadvantages of various flooring types as well as proper care, maintenance, and repair for each type of floor covering. Students will demonstrate proper and safe use of tools used during flooring installation including wet saw, trowels, and carpet knives. | 25 Periods  1,125 Minutes | 16. The student selects and installs various types of floor coverings, including carpet, vinyl tile, ceramic tile, and wood flooring systems. The student is expected to:  (A) describe the methods used to install ceramic tile, carpet, and vinyl tile;  (B) make repairs to ceramic tile, carpet, and vinyl tile; and  (C) use and maintain the tools used for the installation and repair of floor systems, including wet saw, trowels, and carpet knives | |
| **Unit 14: Cabinets and Countertops**  Students will differentiate between the classes and sizes of typical cabinetry such as stock, semi-custom, and custom. Students will familiarize themselves with cabinetry terminology for easy identification of cabinetry components including hardware, drawers, doors, etc. Students will learn how to prepare and apply laminate to a countertop through proper lay out, cutting and installation techniques. | 25 Periods  1,125 Minutes | 15. The student selects and installs base and wall cabinets and countertops. The student is expected to:  (A) describe the classes and sizes of typical base and wall cabinets;  (B) identify cabinet components and hardware and describe their purposes;  (C) lay out factory-made cabinets, countertops, and backsplashes; and  (D) install plastic laminate on a countertop core | |
| **Unit 15: Computer Numeric Control (CNC) Machinery**  During this unit, students will be learn key concepts in the operation of Computer Numerical Control (CNC) Machines and plasma cutters and how computerized systems can increase the efficiency of a manufacturing facility. Students will identify, explain, and demonstrate the proper processes, safety procedures, and maintenance associated with CNC operated machinery and plasma cutters. Students will identify and distinguish between the different types of CNC machines used in the industry and understand the individual purpose each machine has in the industry. | 15 Periods  675 Minutes | 6. The student demonstrates how to use the latest technologies such as computer numeric control (CNC) machinery and plasma machinery. The student is expected to:  (A) identify the important safety issues of the latest technologies; and  (B) identify the important maintenance issues of the latest technologies | |