Maryland CTE Programs of Study

Building Systems (2025)

GENERAL REQUIREMENTS. This course is recommended for students in Grades 10-12. 1

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INTRODUCTION 2

A Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions. 2.A

B The Construction Career Cluster prepares students for careers in designing, planning, and building sustainable infrastructure. This field includes architects, engineers, construction managers, and skilled trades professionals. 2.B

C The Facilities Management Program of Study prepares students for careers in commercial building management through a comprehensive curriculum aligned with industry standards. Throughout this four-course sequence, students master the eleven core competencies established by the International Facility Management Association (IFMA), while earning their OSHA 30 Construction certification. Students develop practical skills in building systems operation, safety management, sustainability practices, and business operations. By program completion, students can perform building systems maintenance, implement safety protocols, manage facility operations, analyze financial data, and develop strategic facility plans. The program prepares students for entry-level facilities management positions and provides foundational knowledge for the Certified Facility Manager (CFM) credential. 2.C

D Building upon foundational knowledge, this course deepens students' understanding of complex building systems while completing OSHA 30 Construction certification requirements. Students master advanced maintenance procedures, sustainability practices, and building automation systems. Through practical applications, students learn to diagnose system issues, implement preventive maintenance programs, and utilize facility management technology. The course emphasizes environmental responsibility and technological solutions in modern facility operations. Students complete their OSHA 30 certification and develop comprehensive safety management skills. 2.D

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E **Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.** 2.E

F **Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.** 2.F

KNOWLEDGE AND SKILLS 3

A **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:** 3.A

1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work. 3.A.1
2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn. 3.A.2
3. Employ effective reading, writing, and technical documentation skills. 3.A.3
4. Solve problems using critical thinking techniques and structured troubleshooting methodologies. 3.A.4
5. Demonstrate leadership skills and collaborate effectively as a team member. 3.A.5
6. Implement safety procedures, including proper handling of hardware and following cybersecurity guidelines. 3.A.6
7. Exhibit an understanding of legal and ethical responsibilities in the IT field, following data privacy laws and best practices for security. 3.A.7
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting. 3.A.8

B **The student identifies various career pathways in the facilities management field. The student is expected to:** 3.B

1. Develop a career plan that includes the necessary education, certifications, job skills, and experience for specific roles in facility management. 3.B.1
2. Create a professional resume and portfolio that reflect skills, projects, certifications, and recommendations. 3.B.2
3. Demonstrate effective interview skills for roles in the construction and facility management field. 3.B.3

C **The student develops technology and digital literacy skills. The student is expected to:** 3.C

1. Use technology as a tool for research, organization, communication, and problem-solving. 3.C.1
2. Use digital tools, including computers, mobile devices, collaboration platforms, and cloud services, to access, manage, and create information. 3.C.2

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3 Analyze building automation systems by programming and operating HVAC controls, lighting systems, and preventive maintenance software, while evaluating environmental monitoring data to optimize building performance. 3.C.3

4 Understand ethical and legal considerations for technology use, including the principles of data protection, copyright, and responsible technology use. 3.C.4

D The student integrates core academic skills into facility management practices. The student is expected to: 3.D

1 Demonstrate the use of clear communication techniques, both written and verbal, that are consistent with industry standards. 3.D.1

2 Analyze numerical data from building automation systems, calculate complex efficiency ratios, and evaluate geometric and trigonometric relationships in building systems. They compute measurements for preventive maintenance scheduling and develop quantitative analyses of system performance. 3.D.2

3 Analyze thermodynamic principles in HVAC operations, evaluate chemical interactions in building systems such as water treatment, and apply physics concepts to understand mechanical system operations. They examine environmental factors affecting building performance through scientific analysis. 3.D.3

E The student analyzes advanced operations and maintenance concepts. The student is expected to: 3.E

1 Diagnose common problems in complex building systems including HVAC, electrical, and plumbing. 3.E.1

2 Develop comprehensive preventive maintenance schedules for building systems and equipment. 3.E.2

3 Implement work order management systems to track and prioritize maintenance tasks. 3.E.3

4 Evaluate building automation system data to optimize building performance. 3.E.4

5 Analyze maintenance records to identify patterns and predict potential system failures. 3.E.5

F The student masters advanced safety protocols and completes OSHA certification. The student is expected to: 3.F

1 Complete all requirements for OSHA 30 Construction certification. 3.F.1

2 Develop site-specific safety protocols for maintenance and construction activities. 3.F.2

3 Create emergency response procedures for various facility crisis scenarios. 3.F.3

4 Conduct comprehensive site safety audits using OSHA guidelines. 3.F.4

5 Design safety training programs for facility staff and contractors. 3.F.5

` Evaluate incident reports to determine root causes and preventive measures. 3.F.6

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G **The student implements sustainability practices in facility operations. The student is expected to:** 3.G

1. Analyze building energy consumption patterns and identify conservation opportunities. 3.G.1
2. Develop water conservation strategies for various facility types. 3.G.2
3. Create waste reduction and recycling programs for facility operations. 3.G.3
4. Calculate the environmental impact of facility operations aligned to Maryland's Building Energy Performance standards (BEPs). 3.G.4
5. Propose cost-effective sustainable solutions for building operations. 3.G.5
6. Evaluate the effectiveness of environmental management systems. 3.G.6

H **The student utilizes facility management technology systems. The student is expected to:** 3.H

1. Operate building management systems to control facility operations. 3.H.1
2. Analyze data from building sensors and monitoring systems. 3.H.2
3. Implement maintenance management software for work order tracking. 3.H.3
4. Create reports using facility management software tools. 3.H.4
5. Evaluate the effectiveness of different technology solutions for facility management. 3.H.5