Odysseyware®

CURRICULUM OVERVIEW

Construction Careers

Career and Technical Education Series

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Construction Careers Course Overview

This course in Construction Technology introduces students to the basics of construction, building systems, engineering principles, urban planning, and sustainability. Students will learn the key techniques in building all types of buildings, as well as the key individuals involved in each step of the process. Many lessons present information on green building techniques and concepts that are becoming a standard part of the construction industry. Safety practices are emphasized in several lessons because construction is one of the most dangerous industries; students will learn that there is no way to be successful in construction without taking such issues seriously. Toward this end, the lessons also explore regulatory agencies and guidelines established for protecting not only construction workers but also the occupants of a building.

- **Unit 1: Introduction to Careers in Construction Technology:** This unit introduces students to the construction process before it discusses careers in detail. Student are introduced to current trends in technology and the types of drawings—floor plan, site plan, and elevation view—that nearly all construction workers need to be able to read. Students then explore various construction careers such as those of civil engineers, general contractors, excavators, masons, ironworkers, electricians and others. We discuss how many of these workers learn their skills through an apprenticeship that moves to a journeyman position before they finally earn master status.

- **Unit 2: Building Life-Cycle Assessment and Regulation:** This unit puts the buildings front and center. First, students learn to apply the life-cycle assessment process to buildings, which helps them see how their work and the decisions they make affect a building's longevity and functionality. This is the course's introduction into issues of sustainability and energy efficiency. This unit also focuses on job-site safety and building codes. Students also explore building codes, inspection procedures, and construction risk management along with the duties of a building inspector and the home inspector. Finally, students are introduced to urban planning and zoning, and learn about the history of urban sprawl. Students will learn about regional planning and the New Urbanism, which seeks to shape the built environment into something more sustainable and less taxing on our limited natural resources.

- **Unit 3: Building Materials and Methods of Construction 1:** This is the first of two units that focus on building materials and methods of construction. First students explore building foundations. Different buildings need different types of foundations and knowing how to properly construct them all is the work of the concrete worker and the mason. In lessons on steel frame construction, we take a brief look at the history of mass-produced steel. Students also explore jobs such as that the ironworker, the individual often perched many floors above street level, welding and riveting steel beams into place. Turning from commercial to residential construction, the next few lessons focus on heavy timber-frame construction and light-frame construction. Finally, students learn about builders and labor/management relations.

- **Unit 4: Building Materials and Methods of Construction 2:** The second unit of building materials and methods of construction is divided between lessons on roofs, the building envelope, cladding, and the field of building science. Students learn about a roof's structural importance to the building and its various components. Students also learn about roofing truss systems, based on the triangle, uniquely engineered for strength and durability. Finally, commercial roofs and roofing materials are explained, along with the duties of the professional roofer. The first chapter's final lesson introduces students to green roofs and solar roofs. In the next chapter students explore the concept of the building envelope, the system that serves as a barrier between the interior and the exterior world. Next, a building's skin—its cladding—is discussed, and students will learn that a structure's cladding and its envelope are not one and the same. Finally, students explore the academic discipline of building science, especially its quest to make buildings stronger and more impervious to natural disasters such as hurricanes and earthquakes.

- **Unit 5: Green Technology, Sustainability, and Preservation:** The final unit focuses on green technology, sustainability, and preservation—all subjects that have been touched on before, but now they become the star of the show. Sustainable construction and green construction codes comes first. A close look at green building materials is next. Students also explore "green" jobs in the construction industry. The course's last chapter focuses on historical preservation and adaptive reuse.

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Unit 1: Introduction to Careers in Construction Technology

Assignments

1. Course Overview
2. Construction Technology: Past, Present, and Future
3. Project: Site View, Elevation View, and Plan View of Your House
4. The Civil Engineer: Construction, Function, and Assessment
5. Project: Be a Structural Engineer
6. Contractors, Managers, and Foremen: Coordinating a Building Project
7 Quiz 1: From Plans to Permanence: How Buildings Get Made
8. Excavators, Masons, and Ironworkers
9. Plumbers, Electricians, and HVAC Professionals
10. Project: Create a Fact Sheet on Plumbing Tip: How to Fix a Running Toilet
11. Carpenters, Glaziers, and Other Tradespeople
12. Project: Using Carpentry Skills to Create a Corrugated Cardboard Shadow Box
13. Quiz 2: Building Systems and the Evolution of the Trades
14. Special Project*
15. Test
16. Course Project Part 1: Design and Build Your Dream House*
17. Glossary and Credits

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Unit 2: Building Life-Cycle Assessment and Regulation

Assignments

1. Life-Cycle Assessment: Materials Manufacturing
2. Project: Analyze a Life-Cycle Assessment Case Study
3. Life-Cycle Assessment and Construction Methods
4. Life-Cycle Assessment: Demolition
5. Project: Construction and Demolition Materials in Single-Family Homes: Analyze an EPA Report
6. Quiz 1: Life-Cycle Assessment: from Cradle to Grave
7. Job-Site Safety and OSHA
8. Building Codes and Inspection
9. Project: Interview a Building Inspector
10. Urban Planning and Zoning
11. Project: Plan Your Own Town
12. Quiz 2: Building Codes and Regulation
13. Special Project*
14. Test
15. Course Project Part 2: Your Dream House: Site Plan and Foundation*
16. Glossary and Credits

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Unit 3: Building Materials and Methods of Construction 1

Assignments

1. Shell and Core Construction: Foundations
2. Project: Foundation Investigation: What's Beneath These World Landmarks
3. Shell and Core Construction: Concrete and Masonry
4. Project: How to Build a Concrete-Framed Building
5. Steel-Frame Construction
6. Quiz 1: Foundations and Shell and Core Construction
7. Heavy Timber-Frame Construction
8. Project: Joinery with Soap and Foam Board
9. Light-Frame Construction
10. The Business of Building
11. Project: Seattle's SR 99: The Alaskan Way Viaduct Replacement Tunnel
12. Quiz 2: Heavy- and Light-Frame Construction
13. Special Project*
14. Test
15. Course Project Part 3: Your Dream House and Sustainable Design: Materials*
16. Glossary and Credits

Construction Careers	Unit 4: Building Materials and Methods of Construction 2	
	Assignments	
	1. Roof Structures and Styles	9. Project: Do-It-Yourself Cladding
	2. Roofing Trusses and Materials	10. Building Science
	3. Project: The Triangle vs. The Rectangle	11. Project: Hurricane Sandy and Building Science
	4. Green Roofs and Solar Roofs	12. Quiz 2: The Envelope and External Finishes
	5. Project: Exploring Cool Roofs	13. Special Project*
	6. Quiz 1: The Roof: Engineering Principles and Materials	14. Test
	7. The Building Envelope	15 Course Project Part 4: Your Dream House and Sustainable Design: Components of Green Building*
	8. Types of Building Cladding	16. Glossary and Credits

Construction Careers	Unit 5: Green Technology, Sustainability, and Preservation	
	Assignments	
	1. Sustainable Construction and Green Construction Codes	9. Project: Adaptive Reuse in Your Community
		10. Preservation Trades Education and Safety
	2. Project: Sustainable Shelter: The FEMA Trailer vs. the Katrina Cottage	11. Project: Finding Work in the Field of Historic Preservation
	3. Green and Not-So-Green Building Materials	12. Quiz 2: Historical Preservation and Construction
	4. Green Construction Jobs	13. Special Project*
	5. Project: Interview a Green Builder	14. Test
	6. Quiz 1: Green Construction Technology	15 Course Project Part 5: Schedule Your Dream Home Build*
	7. Historic Preservation	
	8. Adaptive Reuse	16. Glossary and Credits

CC	Unit 6: Course Review, and Exam	
	Assignments	
	1. Course Project Part 6: Your Dream House: Putting It All Together*	2. Review
		3. Exam

(*) Indicates alternative assignment