

Example of POS Secondary sequence aligned to industry standards



**Suggested Construction
Program of Study**
Secondary Course Sequence



Name _____
 Learner ID _____
 School/College/University _____

SAMPLE

Architecture and Construction

Career Cluster Plan of Study for ► Learners ► Parents ► Counselors ► Teachers/Faculty

This Career Cluster Plan of Study (based on the Architecture and Construction Career Cluster) includes NCCER curriculum that aligns with industry standards and is recommended by the Architecture & Construction statewide Program Management Technical Committee to serve as a guide, along with other career planning materials, as learners continue on a career path. Courses listed within this plan are only recommended coursework and should be individualized to meet each learner's educational and career goals. *This Plan of Study, used for learners at an educational institution, should be customized with course titles and appropriate high school graduation requirements as well as college entrance requirements.

EDUCATION LEVELS	GRADE	English/ Language Arts	Math	Science	Social Studies/ Sciences	Other Required Courses Other Electives Recommended Electives Learner Activities	*Career and Technical Courses and/ or Degree Major Courses for Architecture and Construction	SAMPLE Occupations Relating to This Career Cluster	
Interest Inventory Administered and Plan of Study Initiated for all Learners									
SECONDARY	9	English/ Language Arts I	Algebra I	Earth or Life or Physical Science	State History Civics or World History	All plans of study should meet local and state high school graduation requirements and college entrance requirements. Certain local student organization activities such as SkillsUSA are also important including public speaking, record keeping and work-based experiences.	** <i>Introduction to the Built Environment</i>	<ul style="list-style-type: none"> ► Architect ► Carpenter ► Civil Engineer ► Construction Foreman/Manager ► Contractor ► Demolition Engineer ► Drafter ► Drywall Installer ► Electrician ► Electronic Systems Technician ► Equipment/Material Manager ► General Contractor/Builder ► Heating, Ventilation, Air Conditioning and Refrigeration Mechanic ► Interior Designer ► Painter ► Paperhanger ► Plumber ► Project Estimator ► Project Inspector ► Roofer ► Safety Director ► Sheet Metal Worker ► Tile and Marble Setter 	
	10	English/ Language Arts II	Geometry	Biology	U.S. History		** <i>NCCER CORE Instruction</i>		
	11	English/ Language Arts III Technical Writing	Algebra II	Physics	Economics Psychology		** <i>Additional Courses Selected to Complete Program</i>		
	College Placement Assessments-Academic/Career Advisement Provided								** <i>Additional Courses Selected to Complete Program</i>
	12	English/ Language Arts IV	<i>Dependent on chosen pathway</i>	Chemistry					
Articulation/Dual Credit Transcribed-Postsecondary courses may be taken/moved to the secondary level for articulation/dual credit purposes.									
POSTSECONDARY	Year 13	English Composition English Literature	<i>Dependent on chosen pathway</i>	Physics	American Govt. or History, plus Psychology/ Interpersonal Skills	All plans of study need to meet learner's career goals with regard to required degrees, licenses, certifications or journey worker status. Certain local student organization activities may also be important to include.	Continue courses in selected post-secondary program		
	Year 14	Speech/ Oral Communication	<i>Dependent on chosen pathway</i>	Environmental Science	Sociology Business Law				
	Year 15	Continue courses in the area of specialization.							
	Year 16								

**See course listings within this Draft POS



SAMPLE



Industry Recognized Credentials

National Registry

- Certificate
- Transcript
- Wallet-card
- Confidential
- Portable Credentials
- Documentation of training & skills attainment



NCCER Curriculum – Meets Perkins Requirements

The National Center for Construction, Education, and Research (NCCER) is a curriculum that is tied to national standards. The NCCER curriculum comes with assessments that are aligned to industry standards within the Commercial and Industrial Construction Competency Model.

- WorkKeys and the National Career Readiness Cert.
- Math at Work-Construction
- National Standards Curriculum and Assessments
- NCCER Accreditation Guidelines



INITIAL BROAD-BASED COURSE – .5 - 1 UNIT

(UNITS TO BE DETERMINED BY LOCAL SCHOOL DISTRICT)

Title: Introduction to the Built Environment

1. A broad-based course that introduces students to the wide range of occupations within the Architecture & Construction cluster, including Carpenter, Electrician, Plumber, Architect, Engineer, Project Manager, Drafter,
2. There are two resources for this course:
 - A. Careers in Construction. ISBN-13: 978-0-13-228605-3
 - B. A customized text compiled from NCCER construction texts – modules cover standards approved by the Statewide Architecture & Construction Technical Committee. (optional)

INTRODUCTION TO THE BUILT ENVIRONMENT
Arch-Const. Cluster Intro Course Modules
Draft Menu of Available Modules

Careers in Construction (ISBN13:780132286053) (10 Hours)

Showcases the world of construction and career opportunities available to students interested in pursuing a construction career.

Table of Contents

Chapter 1	Construction: America's Powerhouse Industry
Chapter 2	Consider a Career in Construction
Chapter 3	Is Construction for You?
Chapter 4	Career Guide: Carpenter, Plumber, Electrician, Mason, HVAC Technician, Electronic Systems Technician, Welder, Heavy Equipment Operator, Other Trades
Chapter 5	How Do I Get Started?
Chapter 6	Sources of Information
Chapter 7	Closing

Hours and Content to be determined by local school district for balance of this course.

MODULE 27101-06 – ORIENTATION TO THE CARPENTRY TRADE (2.5 Hours)

1. Describe the history of the carpentry trade.
2. Identify the aptitudes, behaviors, and skills needed to be a successful carpenter.
3. Identify the training opportunities within the carpentry trade.
4. Identify the career and entrepreneurial opportunities within the carpentry trade.
5. Identify the responsibilities of a person working in the construction industry.
6. State the personal characteristics of a professional.
7. Explain the importance of safety in the construction industry

MODULE 27102-06 – BUILDING MATERIALS, FASTENERS, AND ADHESIVES (7.5 Hours)

1. Identify various types of building materials and their uses.
2. State the uses of various types of hardwoods and softwoods.
3. Identify the different grades and markings of wood building materials.
4. Identify the safety precautions associated with building materials.
5. Describe the proper method of storing and handling building materials.
6. State the uses of various types of engineered lumber.
7. Calculate the quantities of lumber and wood products using industry-standard methods.
8. Describe the fasteners, anchors, and adhesives used in construction work and explain their uses.

MODULE 27103-06 – HAND AND POWER TOOLS (10 Hours)

1. Identify the hand tools commonly used by carpenters and describe their uses.
2. Use hand tools in a safe and appropriate manner.
3. State the general safety rules for operating all power tools, regardless of type.
4. State the general rules for properly maintaining all power tools, regardless of type.
5. Identify the portable power tools commonly used by carpenters and describe their uses.
6. Use portable power tools in a safe and appropriate manner.

MODULE 00105-09 Introduction to Construction Drawings (10 Hours)

Familiarizes trainees with basic terms for construction drawings, components, and symbols. Explains the different types of drawings (civil, architectural, structural, mechanical, plumbing/piping, electrical, and fire protection) and instructs trainees on how to interpret and use

MODULE 70101-09 – YOUR ROLE IN THE GREEN ENVIRONMENT (15 Hours)

1. Describe the major challenges to the green environment that are caused directly or indirectly by the built environment.
2. Identify decisions and actions in your personal and work life that impact the green environment.
3. Prioritize your actions in terms of which ones matter most for the green environment.
4. Describe the life cycle phases of a building and the impacts on the green environment over its life cycle.
5. Identify green alternatives to conventional building practices and describe the pros and cons of those alternatives.
6. Identify specific practices you can implement at work to improve your impacts on the green environment.
7. Describe the Leadership in Energy and Environmental Design (LEED) rating process.
8. Identify construction activities that contribute to a project's LEED rating.
9. Identify common construction pitfalls that may affect a project's LEED rating

MODULE 68104-09 - INTRODUCTION TO MASONRY (20 Hours)

1. Discuss the history of masonry.
2. Describe modern masonry materials and methods.
3. Explain career ladders and advancement possibilities in masonry work.
4. Describe the skills, attitudes, and abilities needed to work as a mason.
5. State the safety precautions that must be practiced at a work site, including the following:
 - Safety practices
 - Fall-protection procedures
 - Forklift-safety operations
6. Perform the following basic bricklaying procedures:
 - Mixing of mortar
 - Laying a mortar bed
 - Laying bricks
7. Put on eye protection, respiratory protection, and a safety harness.
8. Use the correct procedures for fueling and starting a gasoline-powered tool.

MODULE 02101-05 – INTRODUCTION TO THE PLUMBING PROFESSION (5 Hours)

1. Describe the history of the plumbing profession.
2. Identify the responsibilities of a person working in the construction industry.
3. State the personal characteristics of a professional.
4. Identify the stages of progress within the plumbing profession and its positive impact on society.

MODULE 68114-09 – INTRODUCTION TO HVAC (7.5 Hours)

1. Explain the basic principles of heating, ventilating, and air conditioning.
2. Identify career opportunities available to people in the HVAC trade.
3. Explain the purpose and objectives of an apprentice training program.
4. Describe how certified apprentice training can start in high school.
5. Describe what the Clean Air Act means to the HVAC trade.
6. Describe the types of regulatory codes encountered in the HVAC trade.
7. Identify the types of schedules/drawings used in the HVAC trade.

MODULE 68113-09 – RESIDENTIAL ELECTRICAL SERVICES (15 Hours)

1. Explain the role of the National Electrical Code® in residential wiring and describe how to determine electric service requirements for dwellings.
2. Explain the grounding requirements of a residential electric service.
3. Calculate and select service-entrance equipment.
4. Select the proper wiring methods for various types of residences.
5. Compute branch circuit loads and explain their installation requirements.
6. Explain the types and purposes of equipment grounding conductors.
7. Explain the purpose of ground fault circuit interrupters and tell where they must be installed.
8. Size outlet boxes and select the proper type for different wiring methods.
9. Describe rules for installing electric space heating and HVAC equipment.
10. Describe the installation rules for electrical systems around swimming pools, spas, and hot tubs.
11. Explain how wiring devices are selected and installed.
12. Describe the installation and control of lighting fixtures

MODULE 44101-08 – INTRODUCTION TO PROJECT MANAGEMENT (2.5 Hours)

1. Define project.
2. Describe the characteristics of a project manager.
3. Describe the basic functions of project management.
4. Cite the importance of ethical approaches to project management.
5. Discuss the flow and phases of a construction project.
6. Describe the four common construction delivery systems.

MODULE 58101-11 - INTRODUCTION TO WIND ENERGY (15 Hours)

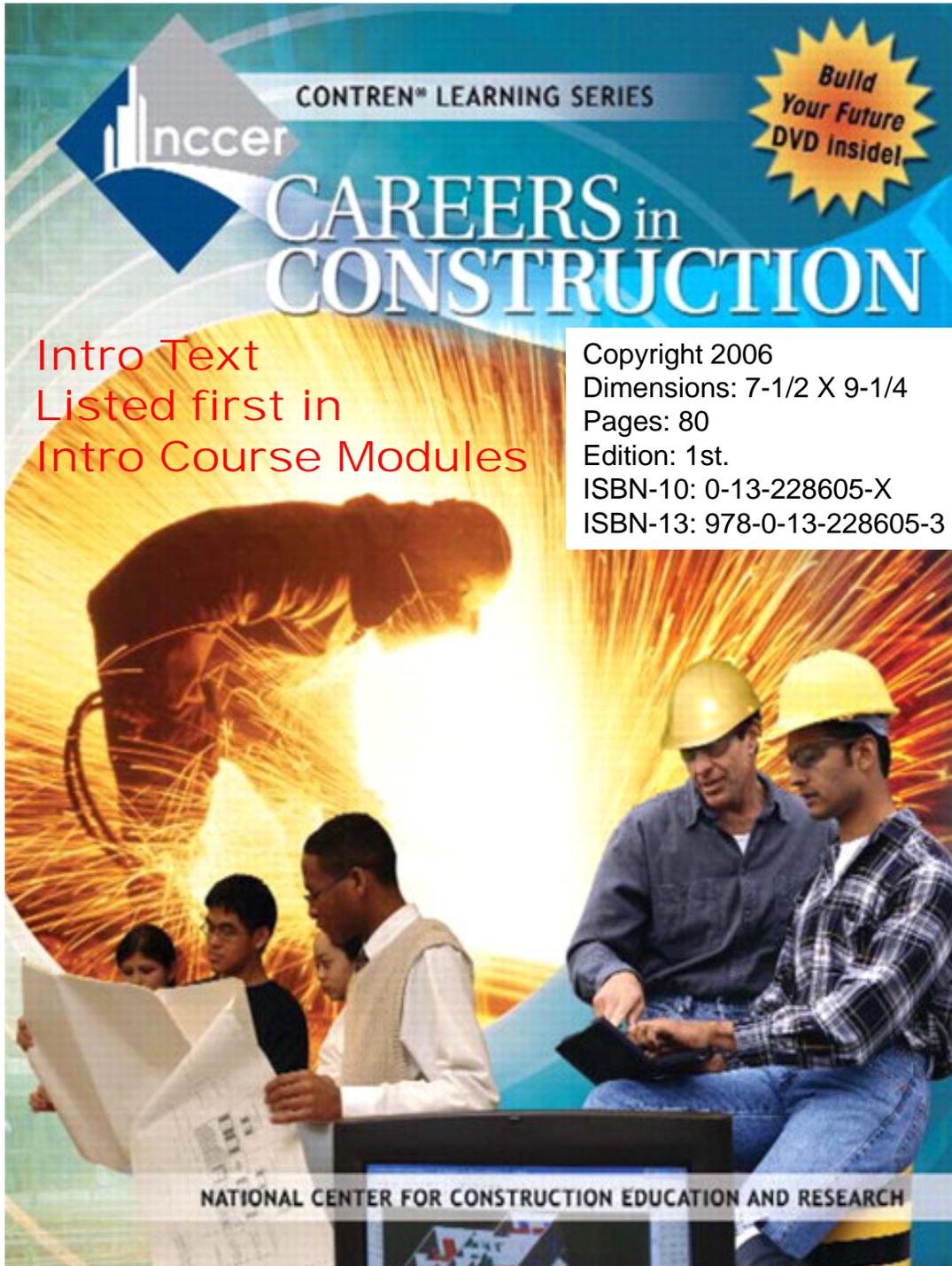
1. Evaluate the advantages and disadvantages of wind power technology.
2. Identify the important events, people, and organizations in the history of wind power to date.
3. Describe wind energy concepts and how the energy is captured.
4. Identify the basic functions and classifications of wind turbines.
5. Identify major horizontal-axis wind turbine (HAWT) components and their function.
6. Describe the wind farm environment and characteristics of the wind energy maintenance technician.

MODULE 29101-09 – WELDING SAFETY (2.5 Hours)

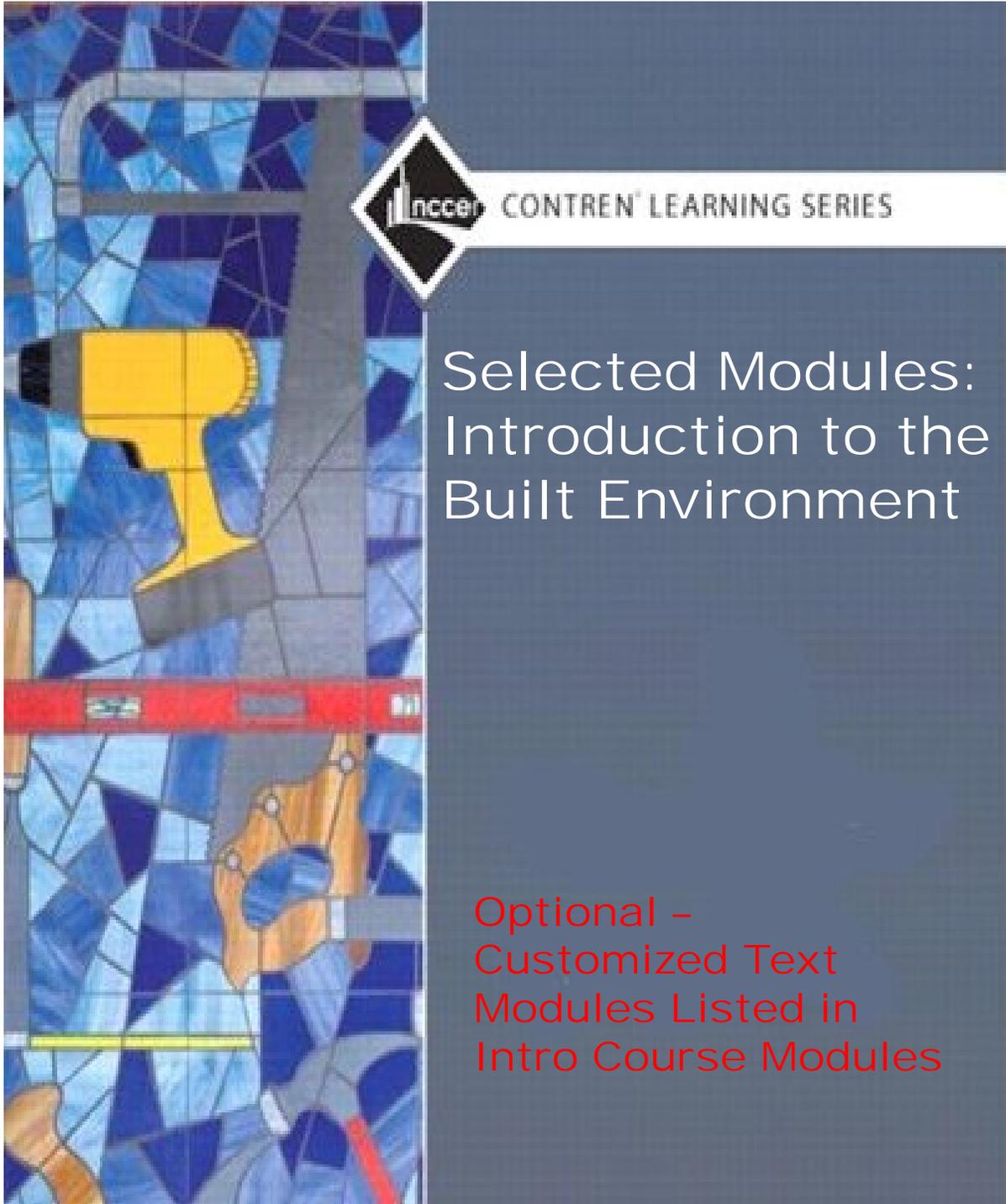
1. Identify some common hazards in welding.
2. Explain and identify proper personal protection used in welding.
3. Describe how to avoid welding fumes.
4. Explain some of the causes of accidents.
5. Identify and explain uses for material safety data sheets.
6. Explain safety techniques for storing and handling cylinders.
7. Explain how to avoid electric shock when welding.
8. Describe proper material handling methods.

MODULE 33101-10 - Electronic Systems Technician - Introduction to the Trade (2.5 Hours)

1. State the purpose of the electronic systems industry and describe the role of an electronic systems technician in the industry.
2. State the role played by industry associations and be able to identify key associations.
3. State the rules for professional and ethical conduct.
4. Describe the importance of codes and standards and explain how they affect the work of the electronic systems technician.
5. Recognize some of the tools used in the industry.
6. Complete job-related forms.



NCCER's *Careers in Construction* showcases the world of construction and career opportunities available to anyone interested in pursuing a construction career. The guide includes a variety of pictures and illustrations as it reviews the pride and excitement of a construction career. This exceptionally produced trainee guide features a highly illustrated design, technical hints and tips from industry experts, review questions and a whole lot more! Key content includes: Construction - America's Powerhouse Industry, Consider a Career in Construction, Is Construction for You?, Career Guide: Carpenter - Plumber - Electrician - Mason - HVAC Technician - Electronic Systems Technician - Welder- Heavy Equipment Operator - Other Trades, How Do I Get Started, Sources of Information, and Closing.



NCCER CONTREN LEARNING SERIES

Selected Modules: Introduction to the Built Environment

Optional -
Customized Text
Modules Listed in
Intro Course Modules

Pearson Publishing will compile this trainee guide featuring selected modules from NCCER publications that support teaching standards established by the Architecture & Construction Cluster Statewide Technical Committee.



NCCER CORE INSTRUCTION – 1 UNIT

Title: NCCER CORE Curriculum

(This course may be offered through a concurrent enrollment if your community college offers this course agreement)

1. The following four pages presents the outline of the NCCER CORE course.
2. The two pages following the outline identify the two texts for this course:
 - A. Core Curriculum: Introductory Craft Skills. ISBN- 978-0-13-608637-6
 - B. From the Ground Up: Class Projects for Forming Framing & Finishing – projects to support the CORE Curriculum ISBN- 978-0-13-229164-4



CORE CURRICULUM: Introductory Craft Skills

Competencies / Objectives

MODULE 00101-09 – BASIC SAFETY

1. Explain the idea of a safety culture and its importance in the construction crafts.
2. Identify causes of accidents and the impact of accident costs.
3. Explain the role of OSHA in job-site safety.
4. Explain OSHA's General Duty Clause and 1926 CFR Subpart C.
5. Recognize hazard recognition and risk assessment techniques.
6. Explain fall protection, ladder, stair, and scaffold procedures and requirements.
7. Identify struck-by hazards and demonstrate safe working procedures and requirements.
8. Identify caught-in-between hazards and demonstrate safe working procedures and requirements.
9. Define safe work procedures to use around electrical hazards.
10. Demonstrate the use and care of appropriate personal protective equipment (PPE).
11. Explain the importance of hazard communications (HazCom) and Material Safety Data Sheets (MSDSs).
12. Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.

MODULE 00102-09 – INTRODUCTION TO CONSTRUCTION MATH

1. Add, subtract, multiply, and divide whole numbers, with and without a calculator.
2. Use a standard ruler, a metric ruler, and a measuring tape to measure.
3. Add, subtract, multiply, and divide fractions.
4. Add, subtract, multiply, and divide decimals, with and without a calculator.
5. Convert decimals to percentages and percentages to decimals.
6. Convert fractions to decimals and decimals to fractions.
7. Explain what the metric system is and how it is important in the construction trade.
8. Recognize and use metric units of length, weight, volume, and temperature.
9. Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.

MODULE 00103-09 – INTRODUCTION TO HAND TOOLS

1. Recognize and identify some of the basic hand tools and their proper uses in the construction trade.
2. Visually inspect hand tools to determine if they are safe to use.
3. Safely use hand tools.

MODULE 00104-09 – INTRODUCTION TO POWER TOOLS

1. Identify power tools commonly used in the construction trades.
2. Use power tools safely.
3. Explain how to maintain power tools properly.

MODULE 00105-09 – INTRODUCTION TO CONSTRUCTION DRAWINGS

1. Recognize and identify basic construction drawing terms, components, and symbols.
2. Relate information on construction drawings to actual locations on the print.
3. Recognize different classifications of construction drawings.
4. Interpret and use drawing dimensions.

MODULE 00106-09 – BASIC RIGGING

1. Identify and describe the use of slings and common rigging hardware.
2. Describe basic inspection techniques and rejection criteria used for slings and hardware.
3. Describe basic hitch configurations and their proper connections.
4. Describe basic load-handling safety practices.
5. Demonstrate proper use of American National Standards Institute (ANSI) hand signals.

MODULE 00107-09 – BASIC COMMUNICATION SKILLS

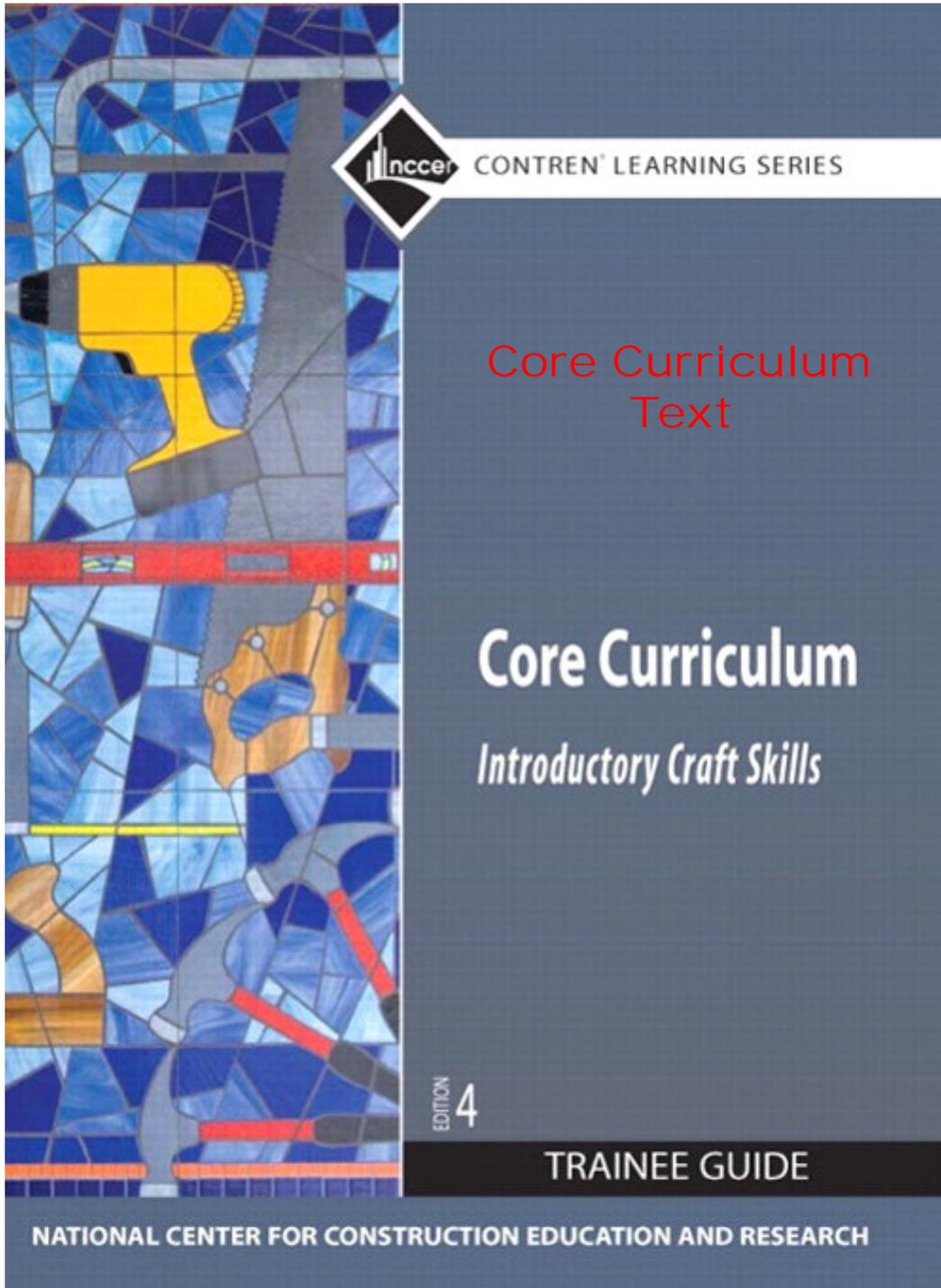
1. Interpret information and instructions presented in both verbal and written form.
2. Communicate effectively in on-the-job situations using verbal and written skills.
3. Communicate effectively on the job using electronic communication devices.

MODULE 00108-09 – BASIC EMPLOYABILITY SKILLS

1. Explain the role of an employee in the construction industry.
2. Demonstrate critical thinking skills and the ability to solve problems using those skills.
3. Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
4. Define effective relationship skills.
5. Recognize workplace issues such as sexual harassment, stress, and substance abuse.

MODULE 00109-09 – INTRODUCTION TO MATERIALS HANDLING

1. Define a load.
2. Establish a pre-task plan prior to moving a load.
3. Use proper materials-handling techniques.
4. Choose appropriate materials-handling equipment for the task.
5. Recognize hazards and follow safety procedures required for materials handling.



This exceptionally produced trainee guide features a highly illustrated design, technical hints and tips from industry experts, review questions and a whole lot more! Nine modules in all provides coverage of: Basic Safety, Introduction to Construction Math, Introduction to Hand Tools, Introduction to Power Tools, Construction Drawings, Basic Rigging, Basic Communication Skills, Basic Employability Skills, and Introduction to Materials Handling.

EDITION **2**
Contren®
Learning Series

From the Ground Up

Class Projects for Forming, Framing, and Finishing

Optional - Text to
Provide Hands-on
Projects to
Support the
Core Curriculum

Features
SkillsUSA
Championships
Projects



National Center
for Construction
Education and
Research

From the Ground Up, 2/e
NCCER ©2006
Prentice Hall ISBN-10: 0132291649

Because Contren© training is competency-based, students must also demonstrate the ability to perform tasks that relate to the subject matter. The forming, framing, and finishing projects in this book will give students the chance to practice many of the skills they are learning about in the classroom. In many projects, they will build things that will help their school or community. Several of the projects produce articles that can be sold to raise money to buy materials and equipment for the program - the doormat, plant stand, picnic table, and play house are good examples.



Additional courses to complete the program:

Total must add up to the additional 1 to 1.5 units needed to complete the 3 unit program course sequence minimum.

- **Drafting / CAD**
- **Construction Technology**
- **Carpentry Fundamentals**
- **Electrical**
- **Plumbing**
- **HVAC-R – Heating, Ventilation, Air Conditioning – Refrig.**
- **CEA - Civil Engineering & Architecture (a PLTW course)**
- **Other courses within the Architecture & Construction cluster**



ABOUT NCCER

NCCER is a not-for-profit 501(c)(3) education foundation created in 1996 as The National Center for Construction Education and Research. It was developed by more than 125 construction CEOs and various association and academic leaders who united to revolutionize training for the construction industry. Sharing the common goal of developing a safe and productive workforce, these companies created a standardized training and credentialing program for the industry. This progressive program has evolved into curricula for more than 60 craft areas and assessments for over 70 exams offered in over 4,000 NCCER-accredited training and assessment centers across the United States.

NCCER develops standardized construction and maintenance curricula and assessments with portable credentials. These credentials are tracked through NCCER's National Registry which allows organizations and companies to track the qualifications of their craft professionals and/or check the qualifications of possible new hires. The National Registry also assists craft professionals by maintaining their records in a secure database.

NCCER's training process of accreditation, instructor certification, standardized curriculum, national registry, assessment, and certification is a key component in the industry's workforce development efforts. NCCER also drives multiple initiatives to enhance career development and recruitment efforts for the industry.