

Introduction to Agricultural Construction	
Course Credit	1.0
Grade Level(s)	9-12
Prerequisites(s)	

Introduction to Agricultural Construction provides students with an overview of framing and building a structure. Topics include lumber, metal, material estimation, floor systems, framing systems (ceiling, wall, roof), and roofing materials for various structures.

Foundational standards, shown in the chart below, are an important part of every course. Through these standards, students learn and apply safety concepts, explore career opportunities and requirements, practice the skills needed to succeed in the workplace, develop leadership and take advantage of the opportunities afforded by Career and Technical Student Organizations. Also, students will learn and practice essential digital skills, and participate in supervised projects which allow them to put into practice the skills and knowledge acquired in the classroom, shop, and lab. Foundational standards are to be incorporated throughout the course

Foundational Standards	
	1. Incorporate safety procedures in handling, operating, and maintaining tools and machinery; handling materials; utilizing personal protective equipment; maintaining a safe work area; and handling hazardous materials and forces. 2. Demonstrate effective workplace and employability skills, including communication, awareness of diversity, positive work ethic, problem-solving, time management, and teamwork. 3. Explore the range of careers available in the field and investigate their educational requirements, and demonstrate job-seeking skills including resume-writing and interviewing. 4. Demonstrate digital literacy by using digital and electronic tools appropriately, safely, and ethically. 5. Participate in a Career Technical Student Organization (CTSO) to increase knowledge and skills and to enhance leadership and teamwork. 6. Participate in Supervised Agricultural Experiences and/or work-based, experiential, and service learning.

Introduction to Agricultural Construction Content Standards

Each content standard completes the stem “Students will...”

Types and Styles of Buildings	1. Compare applications of types and styles of materials that can be used in agricultural structures. <i>Examples: metal (beams, siding, and roofing), wood (beams, timbers)</i>
Grades and Types of Lumber	2. Compare the use of hardwood and softwood lumber in agricultural structures. a. Identify factors that determine grades of lumber. <i>Examples: appearance grade, timber grade, dimension grade</i> b. Identify defects that affect lumber grade. <i>Examples: knot, wane, split, check, warp</i>
Gauges and Types of Metals	3. Determine which metal materials are best suited to various applications in structures, considering appearance, gauge, width, and configurations.
Estimating Materials	4. Calculate a bill of materials for the framing of a structure.
Site Preparation	5. Discuss the purpose and setup of a builder’s level.

Floor Systems

6. Compare advantages of concrete flooring systems and wood flooring systems.
7. Design a wooden floor framing system for a structure.
8. Explain the purpose of a sill.
 - a. Demonstrate the installation of a subfloor for a structure.
9. Design a concrete floor system for a structure.
 - a. Explain the purpose of a footing/foundation.

Wall Framing

10. Design a wall framing system for a structure.
 - a. Compare the use of wood and metal wall framing components.
 - b. Describe the use of a soleplate in structures.
 - c. Describe the construction of post structures.
 - d. Describe the use and installation of wooden and metal studs and posts.
 - e. Describe the installation of double top plates and beams in structures.
 - f. Describe the installation of openings for doors and windows, including headers.
 - g. Describe techniques for bracing a wall.
11. Compare and contrast various wall sheathing materials for structures.

Examples: plywood, foam board, oriented strand board, insulating board
12. Explain the importance of vapor barriers used in framing.
 - a. Compare advantages of using plastic and building felt as vapor barriers in walls.

Ceiling Framing	13. Describe the purpose of a ceiling framing system for a structure. Explain the use of headers in two-story structures, and installation of rough openings for stairs or attic access.
Roof Framing	14. Identify types of roofs used on structures. <i>Examples: hip, shed, gable, gambrel</i> 15. Compare conventional and truss roof systems for structures. - Lay out common, hip, and valley rafters. - Lay out a truss using a framing square. - Demonstrate the installation of rough openings for vents and skylights. 16. Identify various decking materials for roof systems and describe appropriate uses of each material. <i>Examples: tongue and groove plywood, plywood, oriented strand board</i>
Roofing Materials	17. Describe types of materials used for roof systems. <i>Examples: felt, shingles, metal roofing, roll roofing</i> 18. Outline procedures for installing roofing materials.
Electrical Systems	19. Explain and follow National Electric Code (NEC) safety regulations for performing electrical work safely. - Explain the relationship between wire sizes and load limits. - Install outlets, switches, and fixtures.

**Plumbing
Systems**

20. Repair and maintain water supply and drainage systems, using appropriate materials.

Examples: PVC, metal (black, galvanized), Polybutylene