

*Correlation of
Agricultural Mechanics and Technology Systems, by Hancock, Edgar, Pate, Dyer,
and Hoover*

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to

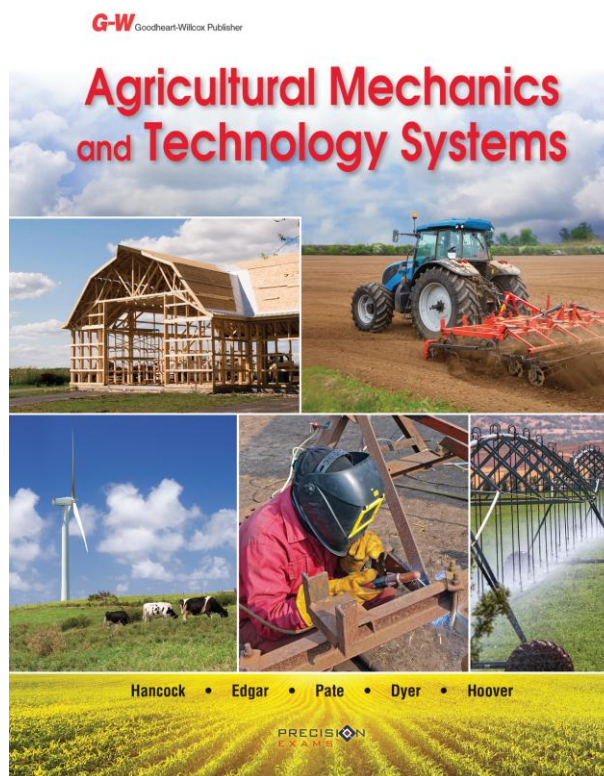
Precision Exams Agricultural Systems and Technology I (110) Standards

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The correlation chart below lists the Standards, Objectives, and Indicators for the Agricultural Systems and Technology I (110) exam in the left column. Corresponding content from *Agricultural Mechanics and Technology Systems* that can be used by a student to help achieve the standard, objective, or indicator is listed in the right column.

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Standards / Objectives / Indicators		Page Number
STANDARD 1		5% of Exam Blueprint
Explain the role of FFA in Agricultural Education		
Objective 1	Discuss the history and organization of FFA as it relates to the complete program of agricultural education.	
1.	Explain the interrelationship of classroom and laboratory instruction, supervised agricultural experience, and FFA.	Experiential Learning 44, Classroom and Laboratory Instruction 45, National FFA Organization 45–48, Supervised Agricultural Experiences (SAEs) 48–54
2.	Describe how, when, and why FFA was organized.	National FFA Organization 45–48
3.	Identify key FFA historical events.	National FFA Organization 45–48

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4.	Identify the mission, strategies, colors, motto, emblem, parts of the emblem, and organizational structure of FFA.	National FFA Organization 45–48
5.	Recite and explain the meaning of the FFA Creed.	National FFA Organization 45–48
6.	Discuss the meaning and purpose of a program of activities and its committee structure.	National FFA Organization 45–48
7.	List FFA chapter officers and discuss the role of each.	National FFA Organization 45–48
Objective 2	Identify opportunities in FFA.	
1.	Describe FFA opportunities that develop leadership skills, personal growth, and career success.	National FFA Organization 45–48
2.	Summarize major state and national activities available to FFA members.	National FFA Organization 45–48
Objective 3	Describe FFA degrees, awards, and career development events (CDEs).	
1.	List and explain the FFA degree areas.	National FFA Organization 45–48
2.	Identify FFA proficiency awards.	National FFA Organization 45–48
3.	List and discuss various team and individual CDEs.	National FFA Organization 45–48
STANDARD 2		<i>3% of Exam Blueprint</i>
Explain the role of supervised agricultural experience (SAE) programs in agricultural education.		
Objective 1	Examine the responsibilities and benefits associated with an SAE.	
1.	Explain the meaning and benefits of supervised agricultural experience.	Experiential Learning 44, Supervised Agricultural Experiences (SAEs) 48–54
2.	Explain the characteristics of an effective SAE program and the responsibilities of those involved.	Supervised Agricultural Experiences (SAEs) 48–54
Objective 2	Determine the types of SAE programs.	
1.	Compare entrepreneurship SAEs and placement SAEs.	Supervised Agricultural Experiences (SAEs) 48–54
2.	Describe research/experimentation SAEs.	Supervised Agricultural Experiences (SAEs) 48–54
3.	Describe exploratory SAEs.	Supervised Agricultural Experiences (SAEs) 48–54
Objective 3	Plan an SAE program.	
1.	Identify the steps in planning an SAE program.	Developing an SAE Plan 54–58
2.	Describe the function of a business/training plan and/or agreement in an SAE program.	Developing an SAE Plan 54–58
3.	Develop a short-range plan and a long-range plan for an SAE program.	Developing an SAE Plan 54–58
4.	Relate classroom and laboratory instruction to an SAE program.	Developing an SAE Plan 54–58
Objective 4	Maintain and use SAE records.	
1.	Explain the importance of keeping records on an SAE program.	SAE Recordkeeping 58–60

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2.	Explain how SAE records are organized.	SAE Recordkeeping 58–60
3.	Follow approved procedures to make entries in SAE records.	SAE Recordkeeping 58–60
STANDARD 3		<i>1% of Exam Blueprint</i>
Describe the role of agricultural education in agricultural systems and technology.		
Objective 1	Investigate agricultural power, structural, and technical systems.	
1.	Explain the meaning and importance of agricultural power, structural, and technical systems.	Agriscience 4–5, Revolutionizing Agriculture 5–10, Sustainable Energy 66–69, Environmental Systems 69–73, Precision Agriculture 73–79, Biotechnology 79–82, Planning Process 256–258, Building Design 406–408, Structure Types 409–411, Framing Types 411–414, Specialized Agricultural Structures 470, Greenhouse Structures 470–481, Hydroponic Systems 481–482, Aquaculture Systems 482–485, Aquaponics 485, Prefabricated Structures 485–486, Earthen Structures 486, Advantages of Electric Motors 600–601, Internal Combustion Engines 898–900, Power Trains 940–946, Power Systems 947–950
2.	Identify and describe career opportunities in agricultural power, structural, and technical systems.	Careers in Agricultural Mechanics 22–23, Job Skills 23–27, Securing Employment 27–34, Finding a Job in Agricultural Mechanics 34–36, Maintaining Employment 37–38
STANDARD 4		<i>25% of Exam Blueprint</i>
Demonstrate appropriate safety practices in agricultural power, structural, and technical systems in laboratory and work settings.		
Objective 1	Explain the meaning and importance of safety in agricultural power, structural, and technical systems.	

Standards / Objectives / Indicators		Page Number
1.	Define safety and describe why it is important.	Hazards in Agricultural Mechanics and Technology 88–89, Safety Regulations 90–93
2.	Identify safety hazards and demonstrate the actions needed to minimize or eliminate risk associated with agricultural power, structural, and technical systems in learning and /or work facilities.	General Safety 100–106, Chemical Safety 106–109, Weather Hazards 109–110, Insect-Borne Illnesses 110, Outdoor Equipment and Machinery 110–113, First Aid 113–114
Objective 2	Implement safety practices related to agricultural power, structural, and technical systems in learning and work facilities.	
1.	Identify, select, and properly use appropriate personal protective equipment (PPE).	Personal Protective Equipment 93–100
2.	Explain the standard OSHA color codes for marking physical hazards.	General Safety 100–106
3.	Verify that all equipment is in good operating condition according to the OSHA standards and that appropriate safety devices are in place and working (e.g., guards in place, tool rests adjusted, etc.).	General Safety 100–106, Personal Protective Equipment 93–100, General Tool Safety 143, Cutting Tools 144–152, Gripping Tools 152–158, Impact Tools 158–163, Leverage Tools 163–164, Tools for Applying Torque 164–169, Extractors 169–170, Cleaning Tools 170–171, Care and Storage of Hand Tools 172–173, Classification of Power Tools 180–184, Power Tool Safety Rules 184–186, Drilling and Driving Tools 186–194, Hydraulic Jacks and Presses 194–196, Cutting Tools 196–209, Grinders and Sanders 209–217
4.	Maintain a neat, well-organized laboratory or shop working area.	General Safety 100–106, Care and Storage of Hand Tools 172–173
Objective 3	Identify fire hazard conditions and actions to take in case of fire.	
1.	Explain combustion and identify three conditions necessary for it to occur.	General Safety 100–106
2.	Describe fire prevention in agricultural power, structural, and technical systems.	General Safety 100–106
3.	Explain classes of fires and appropriate extinguishers.	General Safety 100–106, Chemical Safety 106–109
Objective 4	Take appropriate actions in an accident or emergency.	
1.	Demonstrate the use of simple first aid in an accident with an injury.	First Aid 113–114

Standards / Objectives / Indicators		Page Number
2.	Locate first-aid kits and investigate their contents and use in power, structural, and technical systems settings.	First Aid 113–114
3.	Discuss appropriate safety responses in an accident or emergency.	First Aid 113–114
STANDARD 5		<i>12% of Exam Blueprint</i>
Plan, construct, and appropriately maintain agricultural structures.		
Objective 1	Create and/or use sketches, plans, and specifications for agricultural structures.	
1.	Identify symbols and drawing techniques used in creating sketches and plans.	Sketching 263–265, Technical Drawings 265–271
2.	Use scale measurement and dimensions with sketches and plans.	Sketching 263–265, Technical Drawings 265–271
3.	Identify and interpret different views of construction drawing.	Sketching 263–265, Technical Drawings 265–271
4.	Develop sketches or plans for an agricultural structure.	Planning Process 256–258, Budgeting 258–261, Design Considerations 261–263, Sketching 263–265, Technical Drawings 265–271, Professional Planners 272, Other Sources of Plans 272–273, Construction and Material Standards 273, Preparing a Bid Package 273
Objective 2	Determine materials for agricultural structures.	
1.	Identify types and grades of materials used in constructing agricultural structures, including lumber, plywood, manufactured materials (e.g., particle board and wafer board), roofing, insulation, doors, and windows.	Wood 226–230, Metals 230–234, Composite Materials 235–237, Wood Types and Characteristics 280, Wood Selection 280–285, Concrete Applications and Characteristics 350, Masonry Building Products 379–381, Insulation 455–459, Materials 476–478, Materials 500–507
2.	Identify fasteners and other devices used in constructing agricultural structures.	Fasteners 237–244, Adhesives 244–246, Hardware 246–249

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3.	Identify dimensions and sizes of materials and fasteners used in agricultural structures.	Materials Fasteners, and Hardware 226–249, Bill of Materials 259–260, Dimensions 282–284, Drawings and Plans 308–309, Material Estimation 499–500
Objective 3	Construct small agricultural structure or project.	
1.	Identify and demonstrate safe and proper use of common tools used in agricultural construction.	Hand Tools and Power Tools 101–102, General Tool Safety 143, Power Tool Safety Rules 184–186
2.	Select materials for construction project.	Materials 258, Wood Selection 280–285, Selecting Wood 310–311, Masonry Building 379–381, Building Materials 408
3.	Prepare a bill of materials for a small structure or project, including a cost estimate.	Bill of Materials 259–260
4.	Measure, mark, and cut materials according to plans for an agricultural structure.	Measuring and Marking Tools 120–135, Cutting Wood 285–294, Cutting the Project Parts 313
5.	Assemble an agricultural structure by properly fitting materials and using fasteners.	Fasteners 237–246, Assembling the Project 313–316, Bonds and Patterns 381–385, Installation 507–511
6.	Evaluate a completed structure in terms of plans and quality of work.	Planning Process 256–258, Finishing Project 316–320, Inspection and Maintenance 512–513
Objective 4	Select and use appropriate protective coatings, such as paints and preservatives.	
1.	Discuss the importance of properly selecting and using paints and preservatives.	Finishing the Project 316–320, Painting Areas 698
2.	Identify and use appropriate application methods for coating materials, including surface preparation and safety.	General Safety 100–105, Finishing the Project 316–320, Painting Areas 698, Surface Preparation for Adhesives 732–733
3.	Maintain painting tools and equipment by proper cleaning, storage, and on-job use.	Finishing the Project 316–320, Painting Areas 698
STANDARD 6		<i>7% of Exam Blueprint</i>
Demonstrate basic plumbing knowledge and skills.		
Objective 1	Distinguish plumbing materials and products.	
1.	Describe the meaning and importance of plumbing systems for air, water, wastes, and other fluid-based materials.	Plumbing Systems 626–630

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2.	Identify components of plumbing supply systems and waste systems, including pipe, tubing, valves, faucets, fittings, and fixtures.	Plumbing Design and Installation 626–642
3.	Identify materials used in manufacturing plumbing materials, such as plastics (PVS and CPVC), copper, iron, and steel.	Plumbing Pipe 633–640
4.	Describe how plumbing system components are sized and appropriately match sizes to jobs.	Plumbing Pipe 633–640
5.	Prepare a bill of materials for a plumbing job.	Bill of Materials 259–260
Objective 2	Perform simple plumbing jobs.	
1.	Identify and select appropriate tools for a plumbing job.	Plumbing Tools 630–633
2.	Measure, cut, fit, and install PVC and/or CPVC materials as used in water supply systems, including use of cleaner and cement.	Plumbing Pipe 633–640
3.	Measure, cut, thread, and install iron or steel pipe materials as used in water supply systems.	Plumbing Pipe 633–640
4.	Demonstrate the use of soldering in plumbing applications.	Soldering 637–638
5.	Repair and maintain plumbing systems.	Plumbing Design and Installation 626–642
STANDARD 7		<i>12% of Exam Blueprint</i>
Select, operate, maintain, and repair small internal combustion engines.		
Objective 1	Select and operate internal combustion engines.	
1.	Identify components and systems of internal combustion engines.	Internal Combustion Engines 898–900, Engine Components 906–910
2.	Describe the operation of internal combustion engines by cycle and fuel used.	Engine Classifications 900–906
3.	Use the operator’s manual to operate and maintain an engine properly.	Small Engine Performance, Maintenance, and Troubleshooting 920–934, Manuals, Schedules, and Service Records 956
4.	List and explain criteria to use in selecting an engine.	Engine Classifications 900–906, Engine Selection 924
5.	Obtain and/or prepare the proper fuel for an internal combustion engine.	Fuel System 910–911, Fuel and Air System 926–927, Fuel System 963–967
6.	Start, operate, and shut down an internal combustion engine.	Engine Selection 924, Service Information 929, Machinery Management 966–972
Objective 2	Analyze and troubleshoot internal combustion engines.	
1.	Identify the major components of internal combustion engines and the functions of each.	Engine Components 906–910
2.	Explain the meaning of troubleshooting and list the common engine problems identified/solved by troubleshooting.	Engine Troubleshooting 930–934
Objective 3	Maintain internal combustion engines.	

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1.	Perform routine maintenance, such as cleaning the engine, changing the oil, and cleaning or replacing the air filter.	Engine Maintenance 924–928, Systems Inspection and Maintenance 957–966
2.	Replace and adjust spark plugs as needed.	Checking the Spark 931–932
3.	Winterize or otherwise prepare an engine for extended storage.	Thinking Critically 937
4.	Practice environmental responsibility through the proper disposal of engine wastes, such as oil filters.	Fuel and Air System 926–927, Lubrication System 958–961
Objective 4	Operate small equipment powered by internal combustion engines.	
1.	Identify safety hazards and practices to follow to assure safe operation with small equipment, including mowers, tillers, blowers, and edgers.	Outdoor Equipment and Machinery 110–113, Safety 913–914
2.	Explain the meaning and importance of pre-operation inspections, including those of fuel and oil levers, the air system and the condition of engine components.	Systems Inspection and Maintenance 957–966
3.	Start and safely operate engine-powered equipment.	Engine Selection 924, Service Information 929, Machinery Management 966–972
4.	Stop, properly cool down, and store engine-powered equipment.	–
STANDARD 8		<i>34% of Exam Blueprint</i>
Fabricate with metal.		
Objective 1	Explain kinds of metals and their uses.	
1.	Identify kinds of metals by appearance and testing, such as spark testing.	Metals 230–234, Metals Commonly Used in Agriculture 706–709
2.	Classify metals according to characteristics and uses.	Metals 230–234, Metals Commonly Used in Agriculture 706–709
3.	Identify, maintain, recondition, and use tools in hot and cold metal work.	Metalworking Hammers 159–160, Care and Storage of Tools 172–173, Care and Storage of Power Tools 219, Fundamentals of Metal Working 706–738
Objective 2	Fabricate with hot and cold metal.	
1.	Select and use appropriate safety practices in metal fabrication.	Personal Protective Equipment 93–100, Compressed Gases 107, Safety 756–759, Arc Welding Safety 800–802, Safety 843–846, GTAW Safety 865–866, Plasma Cutting Safety 883–885
2.	Apply cold metal processes in fabrication, including measuring, marking, cutting, bending, tapping, threading, filling, drilling, and riveting.	Fundamentals of Metalworking 706–738

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3.	Discuss the use of hot metal processes, including annealing, tempering, bending, cutting, and hole punching.	Oxyfuel Welding, Cutting, and Brazing 744–771, Shielded Metal Arc Welding 778–813, Gas Metal and Flux Cored Arc Welding 820–851, Gas Tungsten Arc Welding 858–873, Plasma Cutting 880–892
Objective 3	Use shielded metal arc welding (SMAW) process.	
1.	Set up for SMAW operations on carbon steel.	Controlling Welding Parameters 790–795
2.	Start and restart an arc and backfill at the edge while running a bead on carbon steel.	Controlling Welding Parameters 790–795, Practice Welding 802–811
3.	Build a weld pad on carbon steel in the flat position.	Welding a Bead 803–806
4.	Make 1F (flat position-fillet weld) welds on carbon steel.	Welding Position 787–789
5.	Make 2F (horizontal position-fillet weld) welds on carbon steel.	Welding Position 787–789
6.	Make 1G (flat position-groove weld) welds on carbon steel.	Welding Position 787–789
7.	Make 2G (horizontal position-groove weld) welds on carbon steel.	Welding Position 787–789
Objective 4	Use manual oxyfuel gas cutting process.	
1.	Perform safety inspections of equipment and accessories.	Safety 756–759
2.	Set up for manual oxyfuel gas cutting operations on carbon steel.	Setting up the Equipment 759
3.	Perform straight cutting operations on carbon steel.	Oxyfuel Welding and Cutting 744–745, Using a Cutting Torch 763–766
4.	Perform shape cutting operations on carbon steel.	Oxyfuel Welding and Cutting 744–745, Using a Cutting Torch 763–766
5.	Perform bevel cutting operations on carbon steel.	Oxyfuel Welding and Cutting 744–745, Using a Cutting Torch 763–766
6.	Pierce a hole through a carbon steel plate.	Oxyfuel Welding and Cutting 744–745, Using a Cutting Torch 763–766
Objective 5	Use metal arc welding (GMAW) processes.	
1.	Set up for GMAW operations on carbon steel.	Equipment 822–827
2.	Start and restart arc and backfill at the edge while running a bead on carbon steel.	Methods of Metal Transfer 833–835
3.	Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) welds on carbon steel.	Welding Position 787–789, Pulsed Arc 824, Methods of Metal Transfer 833–835
4.	Use Short Circuit Transfer welding process to make 2F (horizontal position-fillet weld) welds on carbon steel.	Welding Position 787–789, Pulsed Arc 824, Methods of Metal Transfer 833–835

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5.	Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) multi-pass weld on carbon steel.	Welding Position 787–789, Pulsed Arc 824, Methods of Metal Transfer 833–835
6.	Use Short Circuit Transfer welding process to make 1G (flat position-groove weld) welds on carbon steel.	Welding Position 787–789, Pulsed Arc 824, Methods of Metal Transfer 833–835
7.	Use Short Circuit Transfer welding process to make 2G (horizontal position-groove weld) welds on carbon steel.	Welding Position 787–789, Pulsed Arc 824, Methods of Metal Transfer 833–835