Kentucky CTE

Agricultural Power, Structural and Technical Systems (2022)

ACADEMIC SKILLS

AA. SPEAKING AND LISTENING AA

1. Utilize effective verbal and non-verbal communication skills AA1
2. Participate in conversation, discussion and group presentations AA2
3. Communicate and follow directions/procedures AA3
4. Utilize speaking and listening skills to communicate effectively with customers and co-workers AA4

AB. READING AND WRITING AB

1. Locate and interpret written information AB1
2. Read and interpret workplace documents, e.g., reports, manuals, schematics, flowcharts, tables, graphs AB2
3. Identify relevant details, facts and specifications AB3
4. Record information accurately and completely AB4
5. Demonstrate competence in organizing, writing and editing using correct vocabulary, spelling, grammar and punctuation AB5
6. Demonstrate the ability to write clearly and concisely using industry-specific terminology AB6

AC. CRITICAL THINKING AND PROBLEM SOLVING AC

1. Utilize critical-thinking skills to determine best options/outcomes, e.g., analyze reliable/unreliable sources of information, use previous experiences, implement crisis management, develop contingency planning AC1
2. Utilize innovation and problem-solving skills to arrive at the best solution for the current situation AC2
3. Implement effective decision-making skills AC3

AD. MATHEMATICS AD

1. Perform basic and higher-level math operations, e.g., addition, subtraction, multiplication, division, decimals, fractions, units of conversion, averaging, percentage, proportion, ratios, numbering systems AD1
2. Solve problems using measurement skills, e.g., distance, weight, area, volume AD2

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3 Make reasonable estimates AD3

4 Use tables, graphs, diagrams and charts to obtain or convey information AD4

5 Use reasoning and problem-solving skills in mathematics AD5

AE. FINANCIAL LITERACY AE

1 Locate, evaluate and apply personal financial information AE1

2 Identify the components of a budget and how one is created AE2

3 Set personal financial goals and develop a plan for achieving them AE3

4 Describe types of financial service providers and considerations in selecting a provider AE4

5 Demonstrate ability to meet financial obligations AE5

AF. INTERNET USE AND SECURITY AF

1 Recognize the potential risks associated with internet and social media use AF1

2 Identify and apply internet security practices, e.g., password security, login, logout, log off, lock computer AF2

3 Practice safe, legal and responsible use of technology in the workplace AF3

AG. INFORMATION TECHNOLOGY AG

1 Use technology appropriately to enhance professional presentations AG1

2 Demonstrate effective, appropriate and ethical use of social media AG2

3 Identify ways social media can be used as marketing, advertising and data gathering tools AG3

AH. TELECOMMUNICATIONS AH

1 Select and utilize the appropriate environment, devices, services and applications to complete workplace tasks AH1

2 Demonstrate appropriate etiquette when using telecommunications, e.g., cell phone, e-mail, messaging services, online meetings, conference calls AH2

EMPLOYABILITY SKILLS

EA. POSITIVE WORK ETHIC EA

1 Explain the importance of pride and confidence about work and learning new tasks EA1

2 Demonstrate consistent and punctual attendance EA2

3 Demonstrate initiative in assuming tasks EA3

4 Exhibit dependability in the workplace EA4

5 Take and provide direction in the workplace EA5

6 Accept responsibility for personal decisions and actions EA6

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INTEGRITY EB

1. Abide by workplace policies and procedures, e.g., safety, internet and cell phone use, code of conduct EB1
2. Demonstrate honesty and reliability EB2
3. Demonstrate ethical characteristics and behaviors EB3
4. Maintain confidentiality and integrity of company information EB4
5. Support the mission and vision of the company EB5

EC. SELF-REPRESENTATION EC

1. Demonstrate appropriate dress and hygiene in the workplace EC1
2. Use language and manners suitable for the workplace EC2
3. Demonstrate polite and respectful behavior toward others EC3

ED. TIME, TASK AND RESOURCE MANAGEMENT ED

1. Plan and follow a work schedule ED1
2. Complete work tasks successfully with minimal supervision ED2
3. Work successfully within budgetary constraints ED3
4. Demonstrate ability to stay on task to produce high-quality deliverables on time ED4

EE. DIVERSITY AWARENESS EE

1. Define and differentiate diversity, equity, inclusion, discrimination and harassment EE1
2. Work effectively with all customers and co-workers EE2
3. Explain the benefits of diversity within the workplace EE3
4. Explain the importance of respect for the feelings, values and beliefs of others EE4
5. Identify strategies to bridge cultural/generational differences and use differing perspectives to increase the overall quality of work EE5
6. Illustrate techniques for eliminating bias and stereotyping in the workplace EE6
7. Identify ways tasks can be structured to accommodate the diverse needs of workers EE7
8. Recognize the challenges and advantages of a global workforce EE8

EF. TEAMWORK EF

1. Recognize the characteristics of a team environment and conventional workplace EF1
2. Demonstrate effective team skills, e.g., setting goals, listening, following directions, questioning, dividing work, conflict resolution, meeting facilitation, and evaluate their importance in the workplace EF2

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EG. CREATIVITY AND RESOURCEFULNESS EG

1. Explain the importance of contributing and conveying new ideas in the workplace EG1
2. Describe the importance of posing questions when developing ideas EG2
3. Explain the value of varying ideas and opinions EG3
4. Locate and verify information during the creative process EG4

EH. CONFLICT RESOLUTION EH

1. Identify conflict resolution skills to enhance productivity and improve workplace relationships EH1
2. Implement conflict resolution strategies and problem-solving skills EH2
3. Explain the use of documentation and its role as a component of conflict resolution EH3

EI. CUSTOMER/CLIENT SERVICE EI

1. Recognize the importance of and demonstrate how to properly greet/approach customers and clients EI1
2. Identify and address needs of customers/clients EI2
3. Provide helpful, courteous and knowledgeable service EI3
4. Identify appropriate channels of communication with customers/clients, e.g., online, phone call, face-to-face EI4
5. Identify techniques to seek and use customer/client feedback to improve company services EI5
6. Explain the relationship between customer/client satisfaction and company success EI6

EJ. ORGANIZATIONS, SYSTEMS AND CLIMATES EJ

1. Define profit and identify factors affecting the profitability of a business EJ1
2. Identify "big picture" issues in conducting business, e.g., forecasting, global market, risk management EJ2
3. Identify roles in fulfilling the mission of the workplace EJ3
4. Identify the rights of workers, e.g., adult and child labor laws, and other equal employment opportunity laws EJ4
5. Recognize the chain of command, organizational flow chart system and hierarchy of management within an organization EJ5

EK. JOB ACQUISITION AND ADVANCEMENT EK

1. Recognize the importance of maintaining a job and pursuing a career EK1
2. Define jobs associated with a specific career path or profession EK2
3. Identify and seek various work experience opportunities, e.g., volunteerism, internships, co-op, part-time/full-time employment EK3

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4 Prepare a resume, cover letter and job application EK4

5 Prepare for and participate in a job interview, e.g., research company, highlight personal strengths, prepare questions, conduct a mock interview, dress appropriately EK5

6 Explain the components of a successful job interview EK6

7 Identify key factors to evaluate employment offers, e.g., salary, benefits packages EK7

8 Explain the proper procedure for leaving a job EK8

EL. LIFELONG LEARNING EL

1 Acquire current and emerging industry-related information EL1

2 Demonstrate commitment to learning as a life-long process and recognize learning opportunities EL2

3 Identify various self-improvement opportunities EL3

4 Explain the importance of adaptability in career planning and self-management, e.g., diverse portfolio, credentials, professional development EL4

5 Employ leadership skills to achieve workplace objectives, e.g., personal vision, adaptability, change, shared vision EL5

6 Recognize the importance of job performance evaluation and coaching as it relates to career advancement EL6

7 Accept and provide constructive criticism EL7

8 Describe the impact of the global economy on jobs and careers EL8

EM. JOB SPECIFIC TECHNOLOGIES EM

1 Identify the value of new technologies and their impact on driving continuous change and the need for lifelong learning EM1

2 Research and identify emerging technologies for specific careers EM2

3 Select appropriate technological resources to accomplish work EM3

EN. HEALTH AND SAFETY EN

1 Identify and assume responsibility for the safety of self and others EN1

2 Follow safety guidelines in the workplace, e.g., OSHA, CDC EN2

3 Explain the impact of personal health and wellness on job performance EN3

OCCUPATIONAL SKILLS

OA. ASSESS ENERGY SOURCES USED IN AGRICULTURE, FOOD AND NATURAL RESOURCES OA

1 Discuss the advantages and disadvantages of types of renewable and non-renewable energy, e.g., solar, wind, hydro, fossil fuels OA1

2 Compare the efficiency of various energy sources, e.g., gas, diesel, natural gas, biofuels OA2

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OB. PROPER UTILIZATION OF TOOLS AND EQUIPMENT OB

1. Demonstrate safe practices specific to agriculture power, structural and technical systems, e.g., PPE, materials handling, shop/laboratory operation OB1
2. Discuss the function of safety systems on tools and equipment, e.g., PTO guard, SawStop, nail gun with sequential trigger OB2
3. Demonstrate proper use of measurement and layout tools OB3
4. Select, maintain and use hand/power tools in service, construction and fabrication OB4

OC. APPLY ELECTRICAL PRINCIPLES IN AGRICULTURAL POWER STRUCTURAL AND TECHNICAL SYSTEMS OC

1. Identify hazards and safety practices in planning and installing an electrical circuit OC1
2. Identify materials and tools used in electrical installation, e.g., wiring, fixtures, breakers, fuses, conduit OC2
3. Interpret basic electrical components, e.g., wiring, switches, receptacles, duplexes and diagrams OC3
4. Differentiate between alternating and direct current OC4
5. Describe types of electrical measurements, e.g., amperage, voltage, wattage, resistance OC5
6. Calculate measurements of electricity, e.g., watts, amps, volts, Ohm's Law OC6
7. Differentiate between the design and function of parallel and series electrical circuits OC7
8. Test and service electrical systems using a multimeter OC8
9. Diagnose malfunctioning electrical system components such as battery and lighting OC9
10. Describe basic operation of electric motors, e.g., parts, electromagnetism OC10
11. Select the proper electric motors, e.g., repulsion start, capacitor, split-phase, for various applications in AFNR OC11

OD. OPERATE, MAINTAIN AND REPAIR ENGINES USED IN THE AGRICULTURE INDUSTRY OD

1. Differentiate between the operation of gasoline and diesel engines OD1
2. Identify components and systems, e.g., cooling, compression, exhaust, fuel, lubrication, ignition, of internal combustion engines OD2
3. Select lubricants based on viscosity, source and equipment compatibility OD3
4. Discuss proper use and disposal of lubricants OD4
5. Assess an internal combustion engine to determine service and repair of basic ignition, fuel and compression using technical manuals and diagnostics OD5

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OE. UTILIZE HYDRAULIC AND PNEUMATIC SYSTEMS OE

1. Identify principles of hydraulic and pneumatic system operation, e.g., Pascal's Law, pressure, flow, valves OE1
2. Interpret basic symbols and diagrams in hydraulic and pneumatic systems OE2
3. Identify basic hydraulic and pneumatic system fittings and ports OE3

OF. OPERATE POWER UNITS AND EQUIPMENT USED FOR AGRICULTURAL PURPOSES OF

1. Demonstrate safe practices in the operation of power units and equipment, e.g. tractors, lawnmowers, generators OF1
2. Outline power unit and equipment controls, startup and shutdown procedures and pre-operation inspections using owners/service manuals OF2
3. Establish a preventative maintenance schedule for power units and equipment, e.g., lubricants, fluids, filters OF3
4. Describe the importance of adjusting equipment including belts, drives, chains, sprockets and maintenance of fluid conveyance components, e.g., hoses, lines, nozzles OF4

OG. DEVELOP PLANS FOR AGRICULTURAL STRUCTURES OG

1. Identify symbols and drawing techniques used to develop plans, sketches and basic blueprints OG1
2. Identify the different types of construction drawings, e.g., design, electrical, elevation, floor plans OG2
3. Create sketches and plans of agricultural structures using scales and legends OG3
4. Prepare bills of materials, e.g., structures, fencing, repair, to accompany plans and sketches OG4

OH. CONSTRUCT AND MAINTAIN AFNR STRUCTURES OH

1. Develop criteria for selecting materials based on cost, quantities and characteristics for a specific project plan OH1
2. Apply basic principles of design, fabrication and installation of agricultural structures OH2
3. Describe options available to make AFNR structures more energy efficient, e.g., solar panels, geothermal energy, natural lighting, rainwater harvesting OH3
4. Discuss the steps, e.g., measuring, cutting, fastening, finishing, in constructing a project out of wood OH4
5. Calculate materials for concrete, brick, stone or masonry units in agricultural construction OH5
6. Describe the proper process to follow when pouring and finishing concrete OH6
7. Distinguish plumbing materials and products, e.g., copper, iron, steel, PVC, PEX OH7

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8 Demonstrate basic plumbing skills, e.g., tool selection, measuring, installing, sweating/soldering, repair OH8

9 Determine proper insulation material and use for a given task in AFNR structures OH9

10 Calculate areas and volumes for coatings, e.g., paints, stains, varnishes OH10

11 Determine proper paint/coating material and method for various tasks OH11

OI. WELDING AND METAL FABRICATION OI

1 Identify metal materials, e.g., steel, aluminum, stainless steel and their characteristics OI1

2 Describe the steps in basic repair, e.g., welding, brazing, riveting, of a metal object OI2

3 Distinguish welding processes, positions, materials preparation and equipment workpiece setup, e.g., beveling/grinding OI3

4 Construct and/or repair metal structures and equipment using welding procedures, including those associated with SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch methods OI4

OJ. APPLY APPROPRIATE TECHNOLOGICAL ADVANCEMENTS IN THE AGRICULTURE INDUSTRY OJ

1 Discuss the use of computer-based systems in agriculture, food and natural resources, e.g., webbased service information, software diagnostics OJ1

2 Describe how Geographic Information System (GIS), Remote Sensing (RS) and Global Positioning System (GPS) are utilized in the agriculture industry OJ2

3 Describe equipment and processes, e.g., auto-guidance, variable-rate technology, yield maps, sensor technology used in precision agriculture OJ3

4 Explain how triangulation is utilized in geospatial technology OJ4

5 Describe robotic and drone applications utilized in agriculture OJ5