

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

- 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

EB. 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**
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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**
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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**
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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**
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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**
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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**
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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**
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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**
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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**

- 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**
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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**
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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**
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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**
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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**

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

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**
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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**
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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**
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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**

- 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**
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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**
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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**