

# Plant Science Systems

## ACADEMIC SKILLS

### AA SPEAKING AND LISTENING

AA1 Utilize effective verbal and non-verbal communication skills

AA2 Participate in conversation, discussion and group presentations

AA3 Communicate and follow directions/procedures

AA4 Utilize speaking and listening skills to communicate effectively with customers and co-workers

### AB READING AND WRITING

AB1 Locate and interpret written information

AB2 Read and interpret workplace documents, e.g., reports, manuals, schematics, flowcharts, tables, graphs

AB3 Identify relevant details, facts and specifications

AB4 Record information accurately and completely

AB5 Demonstrate competence in organizing, writing and editing using correct vocabulary, spelling, grammar and punctuation

AB6 Demonstrate the ability to write clearly and concisely using industry-specific terminology

### AC CRITICAL THINKING AND PROBLEM SOLVING

AC1 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

AC2 Utilize innovation and problem-solving skills to arrive at the best solution for the current situation

AC3 Implement effective decision-making skills

### AD MATHEMATICS

AD1 Perform basic and higher-level math operations, e.g., addition, subtraction, multiplication, division, decimals, fractions, units of conversion, averaging, percentage, proportion, ratios, numbering systems

AD2 Solve problems using measurement skills, e.g., distance, weight, area, volume

AD3 Make reasonable estimates

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

AD5 Use reasoning and problem-solving skills in mathematics

## **AE FINANCIAL LITERACY**

AE1 Locate, evaluate and apply personal financial information

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

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

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

AE5 Demonstrate ability to meet financial obligations

## **AF INTERNET USE AND SECURITY**

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

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

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

## **AG INFORMATION TECHNOLOGY**

AG1 Use technology appropriately to enhance professional presentations

AG2 Demonstrate effective, appropriate and ethical use of social media

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

## **AH TELECOMMUNICATIONS**

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

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

# EMPLOYABILITY SKILLS

## EA POSITIVE WORK ETHIC

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

EA2 Demonstrate consistent and punctual attendance

EA3 Demonstrate initiative in assuming tasks

EA4 Exhibit dependability in the workplace

EA5 Take and provide direction in the workplace

EA6 Accept responsibility for personal decisions and actions

## EB INTEGRITY

EB1 Abide by workplace policies and procedures, e.g., safety, internet and cell phone use, code of conduct

EB2 Demonstrate honesty and reliability

EB3 Demonstrate ethical characteristics and behaviors

EB4 Maintain confidentiality and integrity of company information

EB5 Support the mission and vision of the company

## EC SELF-REPRESENTATION

EC1 Demonstrate appropriate dress and hygiene in the workplace

EC2 Use language and manners suitable for the workplace

EC3 Demonstrate polite and respectful behavior toward others

## ED TIME, TASK AND RESOURCE MANAGEMENT

ED1 Plan and follow a work schedule

ED2 Complete work tasks successfully with minimal supervision

ED3 Work successfully within budgetary constraints

ED4 Demonstrate ability to stay on task to produce high-quality deliverables on time

## EE DIVERSITY AWARENESS

EE1 Define and differentiate diversity, equity, inclusion, discrimination and harassment

EE2 Work effectively with all customers and co-workers

EE3 Explain the benefits of diversity within the workplace

EE4 Explain the importance of respect for the feelings, values and beliefs of others

EE5 Identify strategies to bridge cultural/generational differences and use differing perspectives to increase the overall quality of work

EE6 Illustrate techniques for eliminating bias and stereotyping in the workplace

EE7 Identify ways tasks can be structured to accommodate the diverse needs of workers

EE8 Recognize the challenges and advantages of a global workforce

## **EF TEAMWORK**

EF1 Recognize the characteristics of a team environment and conventional workplace

EF2 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

## **EG CREATIVITY AND RESOURCEFULNESS**

EG1 Explain the importance of contributing and conveying new ideas in the workplace

EG2 Describe the importance of posing questions when developing ideas

EG3 Explain the value of varying ideas and opinions

EG4 Locate and verify information during the creative process

## **EH CONFLICT RESOLUTION**

EH1 Identify conflict resolution skills to enhance productivity and improve workplace relationships

EH2 Implement conflict resolution strategies and problem-solving skills

EH3 Explain the use of documentation and its role as a component of conflict resolution

## **EI CUSTOMER/CLIENT SERVICE**

EI1 Recognize the importance of and demonstrate how to properly greet/approach customers and clients

EI2 Identify and address needs of customers/clients

EI3 Provide helpful, courteous and knowledgeable service

EI4 Identify appropriate channels of communication with customers/clients, e.g., online, phone call, face-to-face

EI5 Identify techniques to seek and use customer/client feedback to improve company services

EI6 Explain the relationship between customer/client satisfaction and company success

## **EJ ORGANIZATIONS, SYSTEMS AND CLIMATES**

EJ1 Define profit and identify factors affecting the profitability of a business

EJ2 Identify "big picture" issues in conducting business, e.g., forecasting, global market, risk management

EJ3 Identify roles in fulfilling the mission of the workplace

EJ4 Identify the rights of workers, e.g., adult and child labor laws, and other equal employment opportunity laws

EJ5 Recognize the chain of command, organizational flow chart system and hierarchy of management within an organization

## **EK JOB ACQUISITION AND ADVANCEMENT**

EK1 Recognize the importance of maintaining a job and pursuing a career

EK2 Define jobs associated with a specific career path or profession

EK3 Identify and seek various work experience opportunities, e.g., volunteerism, internships, co-op, part-time/full-time employment

EK4 Prepare a resume, cover letter and job application

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

EK6 Explain the components of a successful job interview

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

EK8 Explain the proper procedure for leaving a job

## **EL LIFELONG LEARNING**

EL1 Acquire current and emerging industry-related information

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

EL3 Identify various self-improvement opportunities

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

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

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

EL7 Accept and provide constructive criticism

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

## **EM JOB SPECIFIC TECHNOLOGIES**

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

EM2 Research and identify emerging technologies for specific careers

EM3 Select appropriate technological resources to accomplish work

## **EN HEALTH AND SAFETY**

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

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

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

# OCCUPATIONAL SKILLS

## OA ENVIRONMENTAL FACTORS, GROWING MEDIA AND PLANT NUTRIENTS

OA1 Describe how soil is formed and the horizon layers resulting from the formation

OA2 Describe the proper methods to collect soil samples

OA3 Analyze site according to soil type, slope and drainage

OA4 Differentiate the function of various growing media components, e.g., peat, Perlite, Vermiculite

OA5 Determine the relationship of optimal air, temperature and water conditions on plant growth

OA6 Summarize the three measurements of light - color, intensity and duration - that affect plant growth

OA7 Describe pH, its impact on nutrient availability and how to adjust the pH of growing media

OA8 Examine the importance of macronutrients and micronutrients to plant growth

OA9 Identify the essential nutrients for plant growth and development and their major functions, e.g., nitrogen, phosphorus, potassium

OA10 Calculate the amount of fertilizer to be applied based on nutrient recommendation and fertilizer analysis

## OB PRINCIPLES OF CLASSIFICATION, ANATOMY AND PHYSIOLOGY IN PLANT PRODUCTION

OB1 Explain how the binomial nomenclature system is used to classify plants, including the naming of cultivars

OB2 Describe the morphological characteristics used to identify agricultural and herbaceous plants, e.g., life cycles, growth habitat, plant use, monocotyledons or dicotyledons, woody, herbaceous

OB3 Identify structures in a typical plant cell and their functions

OB4 Describe the components, types and functions of plant roots

OB5 Describe the components, types and functions of plant stems

OB6 Describe the components, types and functions of plant leaves

OB7 Describe the components, types and functions of plant flowers

OB8 Describe the components, types and functions of seeds and fruit

OB9 Analyze the life cycle of plant growth/development from seed to seed, e.g., annual, biennial, perennial, cool vs. warm season

OB10 Identify common agronomic crops grown in Kentucky, e.g., corn, wheat, soybeans

OB11 Identify common bedding and nursery crops grown in Kentucky, e.g., marigold, petunia, boxwood, hosta

OB12 Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis

OB13 Explain factors that affect cellular respiration and identify the products and byproducts of cellular respiration

## OC PROPAGATE, CULTURE AND HARVEST PLANTS AND PLANT PRODUCTS

OC1 Describe how to safely operate equipment utilized in plant production

OC2 Explain the importance of equipment cleaning/sanitation in plant production

OC3 Explain how to safely handle and apply chemicals

OC4 Utilize industry-appropriate selection techniques for crop varieties/cultivars, e.g., yield, germination, disease tolerance, growing season

OC5 Analyze seed tag information in crop selection, e.g., germination rate, seeding rate, variety, live seed

OC6 Determine proper techniques to control and manage plant growth through biological, chemical, cultural and mechanical means

OC7 Describe the purpose of plant growth regulators

OC8 Differentiate various watering technologies and methods, e.g., hand, drip, overhead sprinkler, moisture sensors

OC9 Explain methods used for asexual plant propagation, e.g., cuttings, division, separation, layering, budding, grafting

OC10 Describe examples of sexual reproduction in flowering plants, e.g., pollination, cross-pollination, self-pollination

OC11 Explain the purpose of an integrated pest management plan and the components it contains, e.g., action threshold, monitor/identify pests, prevention, control

OC12 Identify the characteristics of major insect pests in Kentucky, e.g., mouth parts, economic impact, life cycle

OC13 Identify major plant disorders in Kentucky and their mitigation strategies, e.g., rust, leaf blight, powdery mildew

OC14 Identify the major invasive weeds found in Kentucky and their mitigation strategies, e.g., johnsongrass, bull thistle, crabgrass, pigweed

OC15 Predict pest and diseases problems based on environmental conditions and life cycles

OC16 Identify appropriate techniques for harvesting and storage of crops grown in Kentucky, e.g., machinery, hand tools, hand harvest, grain bins, coolers



## **OD APPLY PRINCIPLES OF DESIGN IN PLANT SYSTEMS TO ENHANCE THE ENVIRONMENT**

OD1 Describe principles and elements of design that form the basis of artistic impression, e.g., line, form, texture, color

OD2 Discuss the applications of design in agriculture and ornamental plant systems

OD3 Identify tools used for design, e.g., drawing tools, florist tools, landscape design software

## **OE SUSTAINABLE AGRICULTURE PRACTICES IN PLANT PRODUCTION**

OE1 Discuss how imports and exports impact the agriculture markets in the US and abroad

OE2 Interpret how crop production varies based on geographic location within Kentucky and the US, and the economic impact therein

OE3 Describe the purpose of plant patents in the agricultural industry

OE4 Generalize how GMOs impact the agriculture industry

OE5 Identify current technology used in crop production, e.g., plant genetics, biotechnology, GPS, remote sensors

OE6 Distinguish roles and responsibilities of state and federal government agencies as they impact crop production, e.g., Kentucky Department of Agriculture, USDA, FDA

OE7 Discuss the impact of environmental issues on crop production, e.g., surface or groundwater, erosion, drift, chemical residue, runoff, water testing

OE8 Generalize strategies related to the marketing of crop, e.g., futures and forward cash contracts

OE9 Develop planning, production, maintenance and harvest schedules for Kentucky crops

## **OF UTILIZE SOUND BUSINESS PRACTICES IN PLANT PRODUCTION**

OF1 Apply effective record keeping skills including financial records

OF2 Discuss the purpose and components of a marketing plan, e.g., goals, target audience, strategies, budget, timeline

OF3 Assess methods to determine target audience and products for a business

OF4 Define enterprise budget, fixed cost, variable cost and cash flow as they relate to plant production

OF5 Discuss the major issues related to labor management, e.g., H2-A, OSHA, insurance