Ohio CTE

Aviation Unmanned Aircraft Systems (2022)

Business Operations/21st Century Skills: Learners apply principles of economics, business management, marketing and employability in an entrepreneur, manager and employee role to the leadership, planning, developing and analyzing of business enterprises related to the career field. 1

1 **Employability Skills: Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.** 1.1

1 Identify the knowledge, skills and abilities necessary to succeed in careers. 1.1.1

2 Identify the scope of career opportunities and the requirements for education, training, certification, licensure and experience. 1.1.2

3 Develop a career plan that reflects career interests, pathways and secondary and postsecondary options. 1.1.3

4 Describe the role and function of professional organizations, industry associations and organized labor and use networking techniques to develop and maintain professional relationships. 1.1.4

5 Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). 1.1.5

6 Explain the importance of work ethic, accountability and responsibility and demonstrate associated behaviors in fulfilling personal, community and workplace roles. 1.1.6

7 Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. 1.1.7

8 Identify the correlation between emotions, behavior and appearance and manage those to establish and maintain professionalism. 1.1.8

9 Give and receive constructive feedback to improve work habits. 1.1.9

10 Adapt personal coping skills to adjust to taxing workplace demands. 1.1.10

11 Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.11

12 Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits and abusive behavior. 1.1.12

2 **Leadership and Communications: Process, maintain, evaluate and disseminate information in a business. Develop leadership and team building to promote collaboration.** 1.2

Extract relevant, valid information from materials and cite sources of information. 1.2.1

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2 Deliver formal and informal presentations. 1.2.2

3 Identify and use verbal, nonverbal and active listening skills to communicate effectively. 1.2.3

4 Use negotiation and conflict-resolution skills to reach solutions. 1.2.4

5 Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. 1.2.5

6 Use proper grammar and expression in all aspects of communication. 1.2.6

7 Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. 1.2.7

8 Identify the strengths, weaknesses and characteristics of leadership styles that influence internal and external workplace relationships. 1.2.8

9 Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity). 1.2.9

10 Use interpersonal skills to provide group leadership, promote collaboration and work in a team. 1.2.10

11 Write professional correspondence, documents, job applications and resumés. 1.2.11

12 Use technical writing skills to complete forms and create reports. 1.2.12

13 Identify stakeholders and solicit their opinions. 1.2.13

14 Use motivational strategies to accomplish goals. 1.2.14

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3 **Business Ethics and Law: Analyze how professional, ethical and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.** 1.3

1 Analyze how regulatory compliance affects business operations and organizational performance. 1.3.1

2 Follow protocols and practices necessary to maintain a clean, safe and healthy work environment. 1.3.2

3 Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). 1.3.3

4 Identify how federal and state consumer protection laws affect products and services. 1.3.4

5 Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDs], United States Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. 1.3.5

6 Identify deceptive practices (e.g., bait and switch, identify theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance. 1.3.6

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7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act [ADA], Fair Labor Standards Acts [FLSA], Equal Employment Opportunity Commission [EEOC]). 1.3.7
8. Verify compliance with computer and intellectual property laws and regulations. 1.3.8
9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational and professional ethical standards. 1.3.9

4. **Knowledge Management and Information Technology: Demonstrate current and emerging strategies and technologies used to collect, analyze, record and share information in business operations.** 1.4
   1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). 1.4.1
   2. Select and use software applications to locate, record, analyze and present information (e.g., word processing, e-mail, spreadsheet, databases, presentation, Internet search engines). 1.4.2
   3. Verify compliance with security rules, regulations and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to the industry pathway. 1.4.3
   4. Use system hardware to support software applications. 1.4.4
   5. Use information technology tools to maintain, secure and monitor business records. 1.4.5
   6. Use an electronic database to access and create business and technical information. 1.4.6
   7. Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). 1.4.7
   8. Use electronic media to communicate and follow network etiquette guidelines. 1.4.8

5. **Global Environment: Evaluate how beliefs, values, attitudes and behaviors influence organizational strategies and goals.** 1.5
   1. Describe how cultural understanding, cultural intelligence skills and continual awareness are independent. 1.5.1
   2. Describe how cultural intelligence skills influence the overall success and survival of an organization. 1.5.2
   3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.3
   4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.4
   5. Recognize ways in which bias and discrimination may influence productivity and profitability. 1.5.5

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6 Analyze work tasks for understanding and interpretation from a different cultural perspective. 1.5.6

7 Use intercultural communication skills to exchange ideas and create meaning. 1.5.7

8 Identify how multicultural teaming and globalization can foster development of new and improved products and services and recognition of new opportunities. 1.5.8

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6 Business Literacy: Develop foundational skills and knowledge in entrepreneurship, financial literacy and business operations. 1.6

1 Identify business opportunities. 1.6.1

5 Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments and interdepartmental interactions. 1.6.5

9 Explain how the performance of an employee, a department and an organization are assessed. 1.6.9

11 Describe how all business activities of an organization work within the parameters of a budget. 1.6.11

12 Describe classifications of employee benefits, rights, deductions and compensations. 1.6.12

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7 Entrepreneurship/Entrepreneurs: Analyze the environment in which a business operates and the economic factors and opportunities associated with self-employment. 1.7

10 Describe techniques for obtaining experience (e.g., apprenticeship, co-operative [co-op] education, work placement, internship, job shadowing) related to entrepreneurial objective. 1.7.10

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8 Operations Management: Plan, organize and monitor an organization or department to maximize contribution to organizational goals and objectives. 1.8

4 Identify alternative actions to take when goals are not met (e.g., changing goals, changing strategies, efficiencies). 1.8.4

8 Identify routine activities for maintaining business facilities and equipment. 1.8.8

10 Analyze how business management and environmental management systems (e.g., health, safety) contribute to continuous improvement and sustainability. 1.8.10

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10 Sales and Marketing: Manage pricing, place, promotion, packaging, positioning and public relations to improve quality customer service. 1.10

4 Identify the company policies and procedures for initiating product and service improvements. 1.10.4

5 Monitor customer expectations and determine product/services satisfaction by using measurement tools. 1.10.5

8 Use promotional techniques to maximize sales revenue (e.g., advertising, sales promotions, publicity, public relations). 1.10.8

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9 Describe how product mix (e.g., product line, product items) maximize sales revenues, market, share and profit margin. 1.10.9

10 Demonstrate sales techniques. 1.10.10

Safety, Tools and Maintenance: Learners apply principles of safety and use of tools to maintain equipment and the environment to prevent accidents and mitigate hazards. 2

1 Facility Safety: Handle materials, prevent accidents and mitigate hazards. 2.1

1 Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. 2.1.1

2 Identify and communicate hazards associated with slippery surfaces and lighting. 2.1.2

4 Use American National Standards Institute (ANSI) hand signals and symbols. 2.1.4

6 Identify and eliminate workplace clutter and maintain clearance and boundaries. 2.1.6

9 Identify locations and describe use of emergency flush showers, eyewash fountains, Safety Data Sheets (SDSs), fire alarms and exits. 2.1.9

11 Select and operate fire extinguishers based on the class of fire. 2.2.11

12 Conduct safety inspection of a workplace. 2.2.12

2 Personal Safety: Practice personal safety. 2.2

1 Interpret personal safety rights according to the employee Right-to-Know plan. 2.2.1

2 Describe the risk factors associated with working under the influence of drugs, alcohol and stimulants and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. 2.2.2

Aviation and Aeronautics 7

1 Aviation: Describe the airspace system and aviation industry. 7.1

5 Describe the role and function of the Federal Aviation Administration (FAA). 7.1.5

9 Describe classes of airspace and associated requirements and limitations. 7.1.9

4 Aerodynamics: Describe and define aerodynamics based on scientific concepts. 7.4

2 Describe the forces of flight and the three axes of motion. 7.4.2

3 Define Newton's Laws of Motion and Bernoulli's Principle. 7.4.3

4 Identify the parts of an airfoil and describe how an airfoil works. 7.4.4

5 Describe how aircraft configuration affects performance. 7.4.5

6 Discuss the role of thrust and the relationship between lift and drag. 7.4.6

9 Describe the effects of loading, weight and balance on center of gravity and aircraft performance. 7.4.9

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0 Describe the design and power features that affect aircraft stability, performance and limitations. 7.4.10

16 Define load factor and G-forces. 7.4.16

5 Airport Environments: Identify airport environments. 7.5

1 Describe the different types of controlled and uncontrolled airports within the United States. 7.5.1

2 Differentiate between towered and non-towered airports. 7.5.2

3 Identify features of airports and directional traffic patterns and interpret runway markings. 7.5.3

4 Identify lighting systems and explain their function. 7.5.4

5 Describe weather patterns and their impact on airport operations. 7.5.5

6 Meteorology: Identify and describe concepts of meteorology. 7.6

3 Explain the effects of temperature on weather. 7.6.3

6 Identify wind patterns based on weather systems. 7.6.6

9 Describe weather system formation, including air masses and fronts. 7.6.9

11 Describe the types, conditions and factors of turbulence. 7.6.11

12 Describe the types and impact of thunderstorms, tornados, microbursts and hurricanes. 7.6.12

13 Describe wind and wind effects (i.e. crosswind, tailwind, windshear, mountain wave). 7.6.13

7 Air Traffic Control and Communication: Identify, describe and apply concepts of air traffic control and communication. 7.7

6 Define the very high frequency (VHF) and ultra-high frequency (UHF) radio bands and how to access. 7.7.6

7 Describe radio communication, phraseology and light signals. 7.7.7

8 Human Factors: Describe the impact of aviation and flight environment. 7.8

1 Describe the extent of human factors in aircraft accidents. 7.8.1

2 Identify hazardous attitudes of flight. 7.8.2

3 Identify flight problems associated with aviation physiology. 7.8.3

6 Describe the decision-making process in flight and steps to break the chain of poor judgement. 7.8.6

9 Describe the role of the National Transportation Safety Board (NTSB) in accident investigations. 7.8.9

9 Small Unmanned Aircraft Systems 7.9

1 Describe regulatory requirements for certification, rating, inspection, reporting and compliance for small unmanned aircraft systems. 7.9.1

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2 Describe registration requirements for small unmanned aircraft systems. 7.9.2

3 Describe operating rules for small unmanned aircraft systems. 7.9.3

4 Describe operating limitations for small unmanned aircraft systems. 7.9.4

5 Describe small unmanned aircraft waiver policy and requirements. 7.9.5

6 Determine required crew roles (CRM, SRM). 7.9.6

7 Describe the purpose of visual observers, control stations and autonomous operations. 7.9.7

8 Describe pre-flight, in-flight and post-flight communications procedures. 7.9.8

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10 Geographic Information Systems (GIS): Employ GIS computer applications to interpret data, maps and land use. 7.10

1 Interpret and evaluate the accuracy of digital imagery and aerial photography. 7.10.1

2 Define remote sensing. 7.10.2

3 Describe GIS applications for remote sensing. 7.10.3

4 Explain map projections and the use of scales. 7.10.4

5 Describe GIS data structures (e.g., vector, grid, triangulated irregular network [TIN]). 7.10.5

6 Explain digital elevation methods (e.g., digital elevation model [DEM], global positioning system [GPS]). 7.10.6

7 Interpret spatial interpolation and two- and three-dimensional functional spatial analyses. 7.10.7

8 Demonstrate ranging methods. 7.10.8

9 Identify sources of errors in GIS and formulate corrections and solutions. 7.10.9

10 Determine one's position on the earth using GPS. 7.10.10

11 Integrate GPS data into GIS applications. 7.10.11

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11 Preflight Preparation: Describe the necessary actions prior to engaging in flight. 7.11

1 Describe pilot qualifications. 7.11.1

2 Describe airworthiness requirements. 7.11.2

3 Describe weather and environmental obstructions to visibility (e.g., smoke, haze, volcanic ash). 7.11.3

4 Describe weather products and resources required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight. 7.11.4

5 Describe potential flight hazards. 7.11.5

6 Describe the Notice to Air Missions (NOTAM) system and its use. 7.11.6

7 Create cross-country flight plans. 7.11.7

8 Define and describe piloting requirements for special use airspace (SUA), special flight rules areas (SFRA), temporary flight restrictions (TFR), and other airspace areas. 7.11.8

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9 Calculate performance and limitations. 7.11.9

10 Determine performance and limitations by using of charts, tables, and data. 7.11.10

11 Describe atmospheric conditions affecting performance. 7.11.11

12 Describe how pilot technique and airport environment affect aircraft performance and limitations 7.11.12

13 Describe operation of systems. 7.11.13

14 Perform and analyze a preflight assessment. 7.11.14

16 Demonstrate proper engine starting. 7.11.16

18 Perform a before takeoff check. 7.11.18

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12 Takeoff and Landing: Define, determine and navigate aspects of takeoff and landing. 7.12

1 Describe takeoffs, landings, and go-arounds. 7.12.1

2 Demonstrate a normal takeoff and climb. 7.12.2

3 Demonstrate a normal approach and landing. 7.12.3

10 Demonstrate postflight procedures. 7.12.10

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13 Flight Environment: Define, determine and navigate aspects of the flight environment. 7.13

2 Determine right of way and describe minimum safe altitude rules. 7.13.2

3 Demonstrate performance and ground reference maneuvers. 7.13.3

9 Navigate slow flight and stalls. 7.13.9

10 Describe maneuvering during slow flight. 7.13.10

11 Describe power-on and power-off stalls. 7.13.11

14 Demonstrate straight-and-level flight. 7.13.14

15 Demonstrate constant airspeed climbs. 7.13.15

16 Demonstrate constant airspeed descents. 7.13.16

18 Describe recovery from unusual flight attitudes. 7.13.18

20 Analyze the challenges of night operations 7.13.20

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14 Emergency Operations: Define, determine and navigate aspects of emergency flight operations. 7.14

1 Describe emergency operations. 7.14.1

2 Demonstrate emergency descent. 7.14.2

4 Describe systems and equipment malfunctions. 7.14.4

14 Describe characteristics and potential hazards of batteries or other fuel sources. 7.14.14

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15 Describe loss of aircraft control link and fly-aways. 7.14.15

16 Describe loss of Global Positioning System (GPS) signal during flight and potential consequences. 7.14.16