**Course Description:**

Students will learn and simulate fundamentals of air traffic control. Subjects taught include principles of aircraft tracking using radar and transponders, controlling aircraft departures, takeoffs, ground operation and in air flight control. Students will learn and simulate techniques of sequencing aircraft approaches and departures using approach control radar. Students will study concepts of meteorology, the flight environment, identification of emergency codes, fundamental aspects of flight and air navigation.

**Strand 1. 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.

**Outcome 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.

**Competencies**

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

1.1.2. Identify the scope of career opportunities and the requirements for education, training,

certification, licensure and experience.

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

postsecondary options.

1.1.4. Describe the role and function of professional organizations, industry associations and

organized labor and use networking techniques to develop and maintain professional

relationships.

1.1.5. Develop strategies for self‐promotion in the hiring process (e.g., filling out job applications,

résumé writing, interviewing skills, portfolio development).

1.1.6. Explain the importance of work ethic, accountability and responsibility and demonstrate

associated behaviors in fulfilling personal, community and workplace roles.

1.1.7. Apply problem‐solving and critical‐thinking skills to work‐related issues when making decisions

and formulating solutions.

1.1.8. Identify the correlation between emotions, behavior and appearance and manage those to

establish and maintain professionalism.

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

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

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

for them.

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

behavior.

**Outcome 1.2. Leadership and Communications**

Process, maintain, evaluate and disseminate information in a business. Develop leadership and team building to promote collaboration.

**Competencies**

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

1.2.2. Deliver formal and informal presentations.

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

1.2.4. Use negotiation and conflict‐resolution skills to reach solutions.

1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an

intended audience and purpose.

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

1.2.7. Use problem‐solving and consensus‐building techniques to draw conclusions and determine

next steps.

1.2.8. Identify the strengths, weaknesses and characteristics of leadership styles that influence

internal and external workplace relationships.

1.2.9. 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).

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

team.

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

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

1.2.13. Identify stakeholders and solicit their opinions.

1.2.14. Use motivational strategies to accomplish goals.

**Outcome 1.3. Business Ethics and Law**

Analyze how professional, ethical and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.

**Competencies**

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

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

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

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

1.3.5. 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.

1.3.6. 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.

1.3.7. 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]).

1.3.8. Verify compliance with computer and intellectual property laws and regulations.

1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational and professional ethical standards.

**Outcome 1.4. Knowledge Management and Information Technology**

Demonstrate current and emerging strategies and technologies used to collect, analyze, record and share information in business operations.

**Competencies**

1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner,

public address systems).

1.4.2. Select and use software applications to locate, record, analyze and present information (e.g.,

word processing, e‐mail, spreadsheet, databases, presentation, Internet search engines).

1.4.3. 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.

1.4.4. Use system hardware to support software applications.

1.4.5. Use information technology tools to maintain, secure and monitor business records.

1.4.6. Use an electronic database to access and create business and technical information.

1.4.7. Use personal information management and productivity applications to optimize assigned

tasks (e.g., lists, calendars, address books).

1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

**Outcome 1.5. Global Environment**

Evaluate how beliefs, values, attitudes and behaviors influence organizational strategies and goals.

**Competencies**

1.5.1. Describe how cultural understanding, cultural intelligence skills and continual awareness are independent.

1.5.2. Describe how cultural intelligence skills influence the overall success and survival of an organization.

1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings.

1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments.

1.5.5. Recognize ways in which bias and discrimination may influence productivity and profitability.

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

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

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

**Outcome 1.6. Business Literacy**

Develop foundational skills and knowledge in entrepreneurship, financial literacy and business operations.

**Competencies**

1.6.1. Identify business opportunities.

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

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

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

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

**Outcome 1.7. Entrepreneurship/Entrepreneurs**

Analyze the environment in which a business operates and the economic factors and opportunities associated with self-employment.

**Competencies**

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.

**Outcome 1.8. Operations Management**

Plan, organize and monitor an organization or department to maximize contribution to organizational goals and objectives.

**Competencies**

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

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

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

**Outcome 1.10. Sales and Marketing**

Manage pricing, place, promotion, packaging, positioning and public relations to improve quality customer service.

**Competencies**

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

**Strand 2. 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.

**Outcome 2.1. Facility Safety**

Handle materials, prevent accidents and mitigate hazards.

**Competencies**

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.

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

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

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

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

2.2.12. Conduct safety inspection of a workplace.

**Outcome 2.2. Personal Safety**

Practice personal safety.

**Competencies**

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

2.2.2. 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.

**Strand 7. Aviation and Aeronautics**

**Outcome 7.1. Aviation**

Describe the airspace system and aviation industry.

**Competencies**

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

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

**Outcome 7.4. Aerodynamics**

Describe and define aerodynamics based on scientific concepts.

**Competencies**

7.4.1. Compare and contrast aeronautics and aerodynamics.

**Outcome 7.6. Meteorology**

Identify and describe concepts of meteorology.

**Competencies**

7.6.1. Describe the atmospheric layers and their composition.

7.6.2. Describe how atmospheric properties of pressure, condensation, evaporation, precipitation and humidity affect atmospheric conditions and stability.

7.6.3. Explain the effects of temperature on weather.

7.6.4. Describe the effects of gravity, friction and centripetal force on wind.

7.6.6. Identify wind patterns based on weather systems.

7.6.7. Describe factors related to stability (e.g., clouds, fronts, air masses, precipitation).

7.6.10. Describe cycles of moisture and associated precipitation and temperature related phenomena.

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

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

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

7.6.14. Describe the types of icing and their effect on aviation.

**Outcome 7.7. Air Traffic Control and Communication**

Identify, describe and apply concepts of air traffic control and communication.

**Competencies**

7.7.1. Describe the principles of radar.

7.7.2. Describe the components of secondary radar.

7.7.4. Sequence aircraft approaches and departures with approach control radar.

7.7.5. Interpret weather for departures and arrivals.

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

7.7.7. Describe radio communication, phraseology and light signals.

7.7.8. Describe the function of transponders.

7.7.9. Describe causes of lost communication and lost communication procedures.

**Outcome 7.8. Human Factors**

Describe the impact of aviation and flight environment.

**Competencies**

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

7.8.2. Identify hazardous attitudes of flight.

7.8.3. Identify flight problems associated with aviation physiology.

7.8.4. Describe the effects of hypoxia and carbon monoxide.

7.8.5. Identify the rules of supplemental oxygen.

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

7.8.7. Describe the impact of cockpit standardization on accident prevention.

7.8.8. Describe the impact of cockpit automation on human error.

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

**Outcome 7.9.** **Small Unmanned Aircraft Systems**

**Competencies**

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

7.9.3. Describe operating rules for small unmanned aircraft systems.

7.9.4. Describe operating limitations for small unmanned aircraft systems.

**Outcome 7.11. Preflight Preparation**

Describe the necessary actions prior to engaging in flight.

**Competencies**

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

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

7.11.5. Describe potential flight hazards.

7.11.7. Create cross-country flight plans.

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