**Course Description:**

In this first course, students apply knowledge of aviation theory and navigation to flight performance and planning. Students will apply principles of simple machines and fluid mechanics to aircraft operations. Identification of aircraft engines and airframe related systems will be emphasized. Weather theories and concepts are used to interpret weather-briefing documents. Additionally, students will distinguish among airport environments, and understand rules, regulations and orders relevant to the airport industry.

**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 [PSDSs], 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, identity 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 interdependent.

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 the 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.

**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**

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

**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.

2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials.

**Strand 7. Aviation and Aeronautics**

**Outcome 7.1. Aviation**

Describe the airspace system and aviation industry.

**Competencies**

7.1.1. Describe aviation technology from its inception to the current industry, including future trends.

7.1.2. Describe contributions and barriers to the development of aviation.

7.1.3. Describe social and economic impacts that contribute to the movement of people and goods.

7.1.4. Describe the major legislative acts that have impacted aviation.

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

7.1.6. Describe the major FAA categories of aircraft.

7.1.7. Describe the function of the fixed base operator (FBO) and its role in general aviation.

7.1.8. Differentiate between general and commercial aviation.

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

**Outcome 7.3. Mathematics and Physical Principles**

Apply mathematics concepts and physical principles.

**Competencies**

7.3.3. Solve ratio, proportion and percentage problems.

7.3.4. Perform algebraic operations involving the addition, subtraction, multiplication and division of positive and negative numbers.

**Outcome 7.4. Aerodynamics**

Describe and define aerodynamics based on scientific concepts.

**Competencies**

7.4.1. Compare and contrast aeronautics and aerodynamics.

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

7.4.3. Define Newton’s Laws of Motion and Bernoulli’s Principle.

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

7.4.5. Describe how aircraft configuration affects performance.

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

7.4.7. Describe lateral and directional stability and the parts of the aircraft that control the aircraft.

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

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

7.4.11. Describe the purpose of the vertical and horizontal stabilizers and how they affect the path of an aircraft.

7.4.12. Identify the effects of torque (P-factor).

7.4.13. Describe the effects of gyroscopic precession.

7.4.14. Describe the effects of asymmetrical thrust on flight.

7.4.15. Describe the effect of drag and lift on glide.

7.4.16. Define load factor and G-forces.

**Outcome 7.5. Airport Environments**

Identify airport environments.

**Competencies**

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

7.5.2. Differentiate between towered and non-towered airports.

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

7.5.4. Identify lighting systems and explain their function.

7.5.6. Describe noise abatement strategies and procedures.

**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 affects of temperature on weather.

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

7.6.5. Explain the causes of atmospheric circulation.

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).

7.6.8. Describe the causes and effects of temperature inversions.

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

7.6.10. Describe the 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 7.8. Human Factors**

Describe the impact of aviation and flight environment.

**Competencies**

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

7.8.8. 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 7.11 Preflight Preparation**

Describe the necessary actions prior to engaging in flight.

**Competencies**

7.11.1. Describe pilot qualifications.

7.11.2. Describe airworthiness requirements.

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

**Strand 10. Airframe System and Components**

**Outcome 10.1. Landing Gear Systems**

Evaluate and repair aircraft landing gear systems.

**Competencies**

10.1.1. Identify the major types of landing gears and explain how they function.

**Outcome 10.2. Power Systems**

Evaluate and repair hydraulic and pneumatic power systems.

**Competencies**

10.2.1. Describe the function of the aircraft hydraulic systems.

**Outcome 10.6. Electrical Systems**

Evaluate and service airframe electrical systems.

**Competencies**

10.6.1. Describe major components of the electrical system.

**Strand 11. Powerplant System and Components**

**Outcome 11.1. Engines**

Evaluate and service reciprocating, radial and turbine engines.

**Competencies**

11.1.1. Identify the major types of aircraft engines.

**Outcome 11.4. Induction and Exhaust Systems**

Evaluate and service induction and exhaust systems.

**Competencies**

11.4.5. Describe how the exhaust system functions.

**Outcome 11.5. Propellers**

Evaluate and service propellers.

**Competencies**

11.5.1. Describe propeller theory and operation.

**Outcome 11.9. Lubrication and Cooling Systems**

Evaluate and service lubrication and cooling systems.

**Competencies**

11.9.4. Describe how the cooling system functions.