**Course Description:**

Students will learn the major components of an airframe system. Students will inspect, repair, and install instrument, communication and navigation systems. Additionally, students will evaluate and service airframe electrical systems including position, warning, hazard control, ignition systems.

**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).

1.8.5. Use inventory and control systems to purchase materials, supplies and equipment (e.g., Last In, First Out [LIFO]; First In, First Out [FIFO]; Just in Time [JIT]; LEAN).

1.8.6. Identify the advantages and disadvantages of carrying cost and Just-in-Time (JIT) production systems and the effects of maintaining inventory (e.g., perishable, shrinkage, insurance) on profitability.

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**

1.10.2. Determine the customer’s needs and identify solutions.

1.10.3. Communicate features, benefits and warranties of a product or service to the customer.

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

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

1.10.10. Demonstrate sales techniques.

**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.

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

2.1.7. Identify symptoms of exposure to health-threatening environments (e.g., temperature; chemical; biological; noise, vibrations, harshness [NVH] hazards).

2.1.8. Identify procedures for handling, storage and disposal of hazardous materials.

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

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

2.1.12. Conduct safety inspection of a workplace.

2.1.13. Identify the types of ergonomic workflow and the need for them.

**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.

2.2.4. Identify workplace risk factors associated with repetitive motion and lifting, operating and moving heavy objects.

2.2.5. Demonstrate appropriate body mechanics in lifting and moving heavy objects.

**Outcome 2.3. Tool and Equipment Preventative Maintenance**

Identify, use, clean, maintain and perform planned preventative maintenance on tools and equipment.

**Competencies**

2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.

2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment.

2.3.3. Operate power tools and stationary equipment in accordance with established procedures and safety standards.

2.3.4. Ensure the presence and functionality of safety systems and hardware.

2.3.8. Identify the requirements for calibrating metering, monitoring and sensing equipment.

**Outcome 2.4. General Maintenance**

Provide general maintenance to mechanical systems.

**Competencies**

2.4.5. Perform engine oil and filter change.

2.4.6. Replace fuel filters.

2.4.7. Flush and fill the engine cooling system.

2.4.11. Flush, fill and bleed the brake system.

2.4.15. Inspect and service the battery and battery cables, connectors, clamps and hold downs.

2.4.18. Test windshield wiper and washer operations, replace wiper blades and refill the washer reservoir (where applicable).

**Strand 8. Aircraft Maintenance Technician**

Learners apply regulations, concepts and mechanical principles to the inspection and repair of aircraft systems.

**Outcome 8.3. Materials and Processes**

Evaluate materials and perform processes.

**Competencies**

8.3.5. Fabricate and install rigid and flexible fluid lines and fittings.

**Strand 10. Airframe System and Components**

**Outcome 10.1. Landing Gear Systems**

Evaluate and repair landing gear systems.

**Competencies**

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

10.1.2. Inspect and check landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems.

10.1.3. Service and repair landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems.

**Outcome 10.2. Power Systems**

Evaluate and repair hydraulic and pneumatic power systems.

**Competencies**

10.2.2. Identify and select hydraulic fluids.

10.2.3. Inspect, repair and test hydraulic and pneumatic power systems and components.

**Outcome 10.3. Control Systems**

Evaluate and service cabin atmospheric control systems.

**Competencies**

10.3.1. Describe basic cabin atmosphere principles and components.

10.3.2. Inspect, service and repair heating, cooling, air conditioning and pressurization systems and air cycle machines.

10.3.3. Inspect, check, troubleshoot, service and repair oxygen systems.

**Outcome 10.4. Instrument, Communication and Navigation Systems**

Evaluate and service instrument, communication and navigation systems.

**Competencies**

10.4.1. Explain mechanics’ privileges and limitations associated with aircraft instrument systems.

10.4.2. Inspect, service, and repair electronic flight instrument systems.

10.4.3. Install instruments and perform a static pressure system leak test.

10.4.4. Inspect, service and repair autopilot, servos and approach coupling systems.

10.4.5. Inspect, service and repair aircraft electronic communications and navigation systems.

10.4.6. Inspect and repair antenna and electronic equipment installations.

**Outcome 10.5. Fuel Systems**

Evaluate and service airframe fuel systems.

**Competencies**

10.5.2. Inspect and service fuel dump systems.

10.5.3. Perform fuel management transfer and defueling.

10.5.4. Inspect, service and repair pressure fueling systems.

10.5.5. Inspect, service and repair aircraft fuel system components.

10.5.6. Inspect and repair fluid quantity indicating systems.

10.5.7. Troubleshoot, service and repair fluid pressure and temperature warning system.

10.5.8. Inspect, service and repair aircraft fuel systems.

**Outcome 10.6. Electrical Systems**

Evaluate and service airframe electrical systems.

**Competencies**

10.6.1. Describe major components of the electrical system.

10.6.2. Inspect and repair aircraft electrical system components, crimp and splice wiring to manufacturer’s specifications.

10.6.3. Install, check and service airframe electrical wiring, controls, switches, indicators and protective devices.

10.6.4. Inspect, troubleshoot, service and repair alternating current (AC) and direct current (DC) electrical systems.

10.6.5. Inspect and troubleshoot power plant electrical and constant speed and integrated speed drive generators.

**Outcome 10.7. Position, Warning and Hazard Control Systems**

Evaluate and service position, warning and hazard control systems.

**Competencies**

10.7.1. Inspect and service speed and configuration warning systems, electrical brake controls and antiskid systems.

10.7.2. Inspect, troubleshoot and service landing gear position indicator and warning systems.

10.7.3. Describe operations of typical anti-icing and de-icing systems.

10.7.4. Demonstrate preventive maintenance for typical anti-icing and de-icing systems.

10.7.5. Inspect, service and repair airframe ice and rain control systems.

10.7.6. Inspect, service, troubleshoot and repair aircraft fire detection and extinguishing systems.

**Strand 11. Powerplant System and Components**

**Outcome 11.7. Fire Protection Systems**

Evaluate and service engine fire protection systems.

**Competencies**

11.7.1. Inspect, check and service smoke and carbon monoxide detection systems.

11.7.2. Service, troubleshoot and repair engine fire detection and extinguishing systems.