Tennessee CTE

Introduction to Aerospace

Aviation Safety 1

1 The number one priority as a pilot is to maintain the safety of flight. Citing course materials such as textbooks and published guidelines including the Federal Aviation Regulations (FARs), identify the basic safety issues a pilot must be aware of before, during, and after each flight, including but not limited to: pilot's mental and physical condition, collision avoidance, weather conditions, maintaining minimum safe altitudes, visual scanning, right-of-way rules, flight over hazardous terrain, positive exchange of flight controls, and operating within the Federal Aviation Regulations (FARs). 1.1

2 Citing appropriate textual evidence, identify the basic safety issues relating to the aircraft, including but not limited to: aircraft airworthiness, taxiing in wind, operating within the aircraft's approved weight and balance, and airspeed limitations. 1.2

Careers Opportunities in Aviation 2

1 Citing labor and workforce data from public sources such as the United States Bureau of Labor Statistics, research the wide range of career pathways available in aviation today. Create a graphic illustration of major occupations within each pathway, including but not limited to: pilots, airframe and powerplant mechanics (A&P), aeromechanical engineers, aircraft salespersons, airport operators, airline statisticians, air traffic controllers (ATC), and flight service specialists (FSS). 2.1

2 Citing supporting evidence from textbooks, industry magazines, and professional journals, summarize the essential knowledge and skills required for careers in aviation, and describe important aptitudes for success in these careers, such as mechanical, verbal, scientific, manipulative, numerical, administrative, social, and artistic. Complete one or more career aptitude surveys, analyze the results, and discuss how they might inform career decisions in various aviation pathways. 2.2

3 Investigate regulatory agencies, governing bodies, and professional organizations related to the aviation industry, such as the Federal Aviation Administration (FAA), National Transportation Safety Board (NTSB), and National Aeronautics and Space Administration (NASA). Gather information from their websites and available publications to produce a coherent explanation of their functions, jurisdictions, and importance within the industry. 2.3

History of Aviation 3

1 Synthesize course readings to create an illustrated timeline of historical milestones in the development of flight. Describe the major obstacles that were overcome to achieve controlled, sustained, and powered heavier-than-air flight. 3.1

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	2 **Research major contributors to the field of aviation, including scientists, inventors, pilots, and other historical figures, and determine what each person contributed. Discuss their impact on both the development of flight as well as the industry as a whole.** 3.2
Aircraft Structures and Systems 4	1 **Explain the specific functions of various aircraft structures. For example, be able to understand and communicate the purpose for the aircraft's wings, tail, cabin, and other structures. Incorporate relevant design and mathematics concepts as approriate when explaining how specific aircraft structures function. For example, relate how the design of an aircraft's wings leverage the principles of aerodynamics.** 4.1
Aircraft Overview 5	1 **Draw on aviation handbooks and other course materials to outline the specific functions of each aircraft's flight control. Describe the purpose of the aircraft's ailerons, elevators, rudder, and flaps, and explain the effect that each of these controls has on the aircraft's controllability.** 5.1
	2 **Draw on aviation handbooks and other course materials to describe in a verbal or written format how a typical reciprocating engine is used on a general aviation aircraft. Compare and contrast the advantages and disadvantages of a reciprocating engine versus a turbine engine on a training aircraft.** 5.2
	3 **In a graphic illustration such as an annotated diagram or electronic presentation, explain the typical application and operation of the basic electrical system, including but not limited to:** 5.3 A Battery 5.3.A B Alternator / Generator 5.3.B C Circuit Breakers 5.3.C D Master Switch(es) 5.3.D
	4 **Explain how fuel systems operate on a typical aircraft, and cite specific dangers and associated precautions that aircraft personnel should take when inspecting, filling, and draining fuel systems. Given a scenario or diagram assigned by the instructor, demonstrate the ability to identify and describe the characteristics of the fuel system, including but not limited to:** 5.4 A Fuel tanks 5.4.A B Fuel selector valves 5.4.B C Fuel filters and drains 5.4.C
	5 **Explain the typical application and operation of the basic ignition system, including but not limited to:** 5.5 A Magnetos 5.5.A B Spark plug wires 5.5.B C Spark plugs 5.5.C

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6 **Explain the typical application and operation of the basic flight instruments, including but not limited to:** 5.6

- A Airspeed Indicator 5.6.A
- B Attitude Indicator 5.6.B
- C Altimeter 5.6.C
- D Turn Coordinator 5.6.D
- E Directional Indicator 5.6.E
- F Vertical Speed Indicator 5.6.F

7 **Explain the typical application and operation of the basic engine instruments, including but not limited to:** 5.7

- A Oil Pressure Gauge 5.7.A
- B Oil Temperature Gauge 5.7.B
- C Cylinder Head Gauge 5.7.C

8 **Explain the typical application and operation of the basic communication and navigation radios and instrumentation, including but not limited to:** 5.8

- A Comm # 1 5.8.A
- B Comm # 2 5.8.B
- C Nav # 1 5.8.C
- D Nav # 2 5.8.D

Flight Environment 6

1 **Research and develop illustrative models that compare and contrast characteristics of the two basic types of airspace:** 6.1

- A Controlled 6.1.A
- B Uncontrolled 6.1.A

2 **Consult FAA guidelines to synthesize understanding of air traffic control (ATC) procedures related to visual flight rules (VFR) and instrument flight rules (IFR) operations. Explain the circumstances and conditions of operation regarding:** 6.2

- A Airport operations 6.2.A
- B Local area procedures 6.2.B

3 **Cite textual evidence from course materials and industry guidelines to explain the importance of meteorological knowledge among aviation professionals. Outline key concepts and terminology for the following:** 6.3

- A Basic weather theory 6.3.A
- B VFR Minimums 6.3.B
- C IFR Minimums 6.3.C

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Basic Procedures 7

1 **Under normal conditions, determine adequate benchmarks surrounding the basic aspects of pre-flight, such as: Accurately assess basic situations and conditions in order to make a go/no go decision.** 7.1

- A Pilot's mental and physical health 7.1.A
- B Airworthiness of aircraft 7.1.B
- C Weather 7.1.C
- D Weight and balance 7.1.D
- E Fuel requirements 7.1.E
- F Departure and destination airport conditions 7.1.F

2 **Explain and demonstrate in a mock situation or drill (including but not necessarily involving a digital flight simulator) the following basic procedures:** 7.2

- A Pre-flight inspection 7.2.A
- B Starting the engine 7.2.B
- C Taxiing technique(s) 7.2.C
- D Takeoffs 7.2.D
- E Fundamentals of flight 7.2.E
- F Airport traffic patterns 7.2.F
- G Wake turbulence 7.2.G
- H Collision avoidance techniques 7.2.H
- I Landings 7.2.I

3 **Under normal conditions, determine adequate benchmarks surrounding the basic aspects of in-flight actions, such as: Accurately assess current conditions in order to evaluate a decision to return to departure airport, land at an enroute airport, or continue to destination.** 7.3

- A Changes in pilot's mental and physical health 7.3.A
- B Actual wind and weather conditions 7.3.B
- C Fuel reserve 7.3.C
- D Destination and alternate airport conditions 7.3.D

4 **Under normal conditions, determine adequate benchmarks surrounding the basic aspects of post-flight actions, such as: Accurately assess basic situations and conditions experienced in order to make better future go/no go decisions.** 7.4

- A Post flight aircraft inspection to determine airworthiness of aircraft 7.4.A
- B Evaluation of forecast versus actual weather encountered 7.4.B
- C Comparison of estimated fuel requirements versus actual fuel consumption 7.4.C

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xplain how basic Pilotage and Dead Reckoning (DR) techniques work, and recognize when they are appropriate. Describe how pilots use such techniques in

		order to fly from one point or location to another , drawing on textbooks and other course materials to provide accurate analyses of different flight situations. 8.1
Judgment Training 9	**1**	**Explore techniques for improving pilot judgment and decision-making skills. Develop an original mock scenario in which a pilot must react to an in-flight complication or malfunction. Outline a strategy or how-to guide for remaining calm under pressure, maintaining lines of communication, and making sound decisions.** 9.1