

Instructional Framework



Air Transportation

36.0202.00

This Instructional Framework identifies, explains, and expands the content of the standards/measurement criteria, and, as well, guides the development of multiple-choice items for the Technical Skills Assessment. This document corresponds with the Technical Standards endorsed on May 13, 2014, and May 19, 2021.

Domain 1: Systems and Operations	
Instructional Time: 35 - 45%	
STANDARD 4.0 EXAMINE AIRFRAME AND POWERPLANT SYSTEMS	
4.1 Describe and identify powerplant components and the theory of operation	<ul style="list-style-type: none">• Turbine engines• Piston<ul style="list-style-type: none">◦ Types of piston engines◦ The correct sequence of reciprocating engine• Four-cycle engines• Bernoulli's principle<ul style="list-style-type: none">◦ Carburetor
4.2 Describe a basic cooling system, its equipment operations and possible malfunctions	<ul style="list-style-type: none">• Engine cooling<ul style="list-style-type: none">◦ Internal and external• Engine overheating
4.3 Describe various aircraft fuel systems, their equipment operations and possible malfunctions	<ul style="list-style-type: none">• Proper fuel• Gravity feed• Fuel pump• Preflight checks
4.4 Apply basic principles of electricity to various aircraft electrical systems	<ul style="list-style-type: none">• Basic circuits• Redundancy
4.5 Describe a basic lubrication system, its equipment operations and possible malfunctions	<ul style="list-style-type: none">• Engine cooling<ul style="list-style-type: none">◦ Internal and external
4.6 Describe basic aircraft hydraulics systems, their equipment operations and possible malfunctions	<ul style="list-style-type: none">• Retractable landing gear• Pressure<ul style="list-style-type: none">◦ Over or under

4.7 Demonstrate basic operation of an aircraft engine, including proper interpretation of engine instruments	<ul style="list-style-type: none"> • Intake • The correct sequence of reciprocating engine • Interpret engine and electrical instruments
STANDARD 5.0 EXAMINE AEROSPACE NAVIGATIONAL SYSTEMS AND PROCEDURES	
5.1 Define basic navigational concepts (e.g., pilotage, dead reckoning, and radio navigation)	<ul style="list-style-type: none"> • Pilotage • Dead reckoning • Radio navigation <ul style="list-style-type: none"> ◦ Non-directional beacon (NDB) ◦ Instrument Landing System (ILS) • Types and deviations of compasses • Glass cockpit
5.2 Describe and demonstrate VOR equipment and navigation	<ul style="list-style-type: none"> • Very High Frequency Omnidirectional and Range (VOR) • Instrumentation and function • Interpretation
5.3 Describe and demonstrate GPS equipment and operations	<ul style="list-style-type: none"> • Global Positioning System (GPS) • Instrumentation and function • Interpretation
5.4 Explain RNAV principles	<ul style="list-style-type: none"> • Area Navigation (RNAV) • Instrumentation and function • Interpretation
5.5 Use various flight planning computers	<ul style="list-style-type: none"> • E6B <ul style="list-style-type: none"> ◦ Manual and digital
5.6 Explain the use of VFR sectional charts and supplemental electronic tablet	<ul style="list-style-type: none"> • Visual Flight Rules (VFR) sectional charts • Find locations on a map using latitude and longitude • Interpret types of airspace using a sectional chart/electronic tablet
5.7 Explain en-route and terminal approach and departure procedures	<ul style="list-style-type: none"> • Using appropriate manuals • Chart Supplement
5.8 Explain emergency procedures for lost communications	<ul style="list-style-type: none"> • Transponder • Squak 7600 • Continue flight plan • Light gun signals

5.9 Discuss and interpret aircraft navigational performance	<ul style="list-style-type: none"> • Determine position from Very High Frequency Omnidirectional and Range (VOR)
5.10 Plan and demonstrate a cross-country flight	<ul style="list-style-type: none"> • 1-800-WX-BRIEF • Use of plotter • File a simulated flight plan
5.11 Explain the national airspace system	<ul style="list-style-type: none"> • Interpret types of airspace using a sectional chart/electronic tablet • Various classes of airspace and rules
STANDARD 6.0 DEMONSTRATE AIRPORT OPERATIONS AND MANAGEMENT	
6.1 Discuss the airport as a system of integrated components and operations	<ul style="list-style-type: none"> • Air traffic control • Security • Aircraft support • Terminal management • Information systems • Crash Rescue • Airport Terminal Information Service (ATIS) • Airport operations
6.2 Explain airport flight and ground operations, including airport and runway signs, markings, and lighting	<ul style="list-style-type: none"> • Beacons • Taxiway/runway lights • Signage • Land and hold short operations
6.3 Analyze methods to improve runway incursion avoidance and detection capabilities	<ul style="list-style-type: none"> • Land and hold short operations • Airport Terminal Information Service (ATIS) • Air traffic control • Notice to air missions (NOTAMS)
6.4 Explain airport support systems and function (e.g., air traffic control, security, aircraft support, terminal management, and information systems)	<ul style="list-style-type: none"> • Air traffic control • Security • Aircraft support • Terminal management • Information systems • Crash rescue • Airport operations
6.5 Use and explain aircraft voice communications equipment and proper phraseology in ATC communications, including phonetic alphabet	<ul style="list-style-type: none"> • Pilot phraseology <ul style="list-style-type: none"> ◦ Taxi, entering the pattern, take off • Air Traffic Control (ATC) phraseology

	<ul style="list-style-type: none"> ○ Taxi, entering the pattern, take off ● Twenty-four-hour clock <ul style="list-style-type: none"> ○ UTC ○ GMT ○ Zulu
STANDARD 9.0 DEMONSTRATE FLIGHT PLANNING SKILLS	
9.1 Apply weight and balance theory and calculations	<ul style="list-style-type: none"> ● Proper center of gravity (CG) ● Weight of fuel ● CG effect on stability and performance
9.2 Demonstrate flight planning procedures (e.g., route, weather, fuel, airports, NOTAMS, flightlog, and post-flight operations)	<ul style="list-style-type: none"> ● Route ● Weather ● Fuel ● Airports ● NOTAMS ● Flight log ● Post-flight operations ● Airspace
9.3 Explain aircraft performance and limitations (e.g., use of charts, tables, and data to determine performance; and effects of atmospheric conditions on aircraft performance)	<ul style="list-style-type: none"> ● Use of charts, tables, and data to determine performance ● Effects of atmospheric conditions on aircraft performance <ul style="list-style-type: none"> ○ Rain, hail, ice, etc. ● Density altitude vs. pressure altitude
9.4 File a VFR/IFR flight plan	<ul style="list-style-type: none"> ● Digital Visual Flight Rules (VFR) flight plan filing

Domain 2: Human Factors and Meteorology Instructional Time: 30 - 35%	
STANDARD 8.0 ANALYZE AVIATION METEOROLOGY	
8.1 Explain weather theory	<ul style="list-style-type: none"> ● Standard lapse rate ● Principles of high and low pressure ● Standard temperature and pressure ● Cloud formations ● Stability of air masses ● Fronts
8.2 Identify and explain how to deal with weather hazards	<ul style="list-style-type: none"> ● Flight planning

	<ul style="list-style-type: none"> • Detect and avoid
8.3 Access and analyze weather reports, charts, and forecasts from various sources	<ul style="list-style-type: none"> • Read a Meteorological Report (METAR) • Read a Terminal Area Forecast (TAF) • 1-800-WX-BRIEF • Winds aloft
STANDARD 10.0 ANALYZE HUMAN FACTORS IN AVIATION SAFETY	
10.1 Explain CRM (Crew Resources Management) as a set of training procedures	<ul style="list-style-type: none"> • ADM (Aeronautical Decision Making) skills • Checklists • IMSAFE pilot and crew <ul style="list-style-type: none"> ◦ I: Illness ◦ M: Medication ◦ S: Stress ◦ A: Alcohol and drugs ◦ F: Fatigue ◦ E: Eating and Emotion
10.2 Explain and demonstrate situation awareness	<ul style="list-style-type: none"> • Situation awareness • Cockpit overload • Focus and distraction
10.3 Explain and demonstrate correct ADM (Aeronautical Decision Making) skills	<ul style="list-style-type: none"> • ADM (Aeronautical Decision Making) skills • IMSAFE pilot and crew <ul style="list-style-type: none"> ◦ I: Illness ◦ M: Medication ◦ S: Stress ◦ A: Alcohol and drugs ◦ F: Fatigue ◦ E: Eating and Emotion • Multiple courses of action • Checklists • Risk management
10.4 Explain basic aviation physiology (e.g., symptoms, causes, effects, and corrective actions for hypoxia, hyperventilation, middle ear, and sinus problems; spatial disorientation, motion sickness, carbon monoxide poisoning, stress and fatigue, and dehydration; and physiological aspects of night flying, light systems, night orientation, and night illusions)	<ul style="list-style-type: none"> • Symptoms, causes, effects, and corrective actions for: <ul style="list-style-type: none"> ◦ Hypoxia ◦ Hyperventilation ◦ Middle ear ◦ Sinus problems • Spatial disorientation • Motion sickness • Carbon monoxide poisoning

	<ul style="list-style-type: none"> • Stress and fatigue • Dehydration • Physiological aspects of night flying • Light systems • Night orientation • Night illusions
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Domain 3: Fundamentals and Regulations
Instructional Time: 20 - 25%

STANDARD 2.0 RECOGNIZE THE FUNDAMENTALS OF FLIGHT

2.1 State and give examples of the application of flight (e.g., Newton's laws of motion, Bernoulli's principle, and Venturi effect)	<ul style="list-style-type: none"> • Newton's laws of motion • Bernoulli's principle • Venturi effect • Angle of attack • Left turning tendency • Velocity vs. G loads • Ground effect
2.2 Name and compare the four forces of flight (i.e., weight, lift, drag, thrust, etc.)	<ul style="list-style-type: none"> • Weight • Lift • Drag • Thrust • Unaccelerated flight
2.3 Identify the function and parts of an airfoil, including flight control surfaces (e.g., leading edge, trailing edge, chord, and upper and lower camber)	<ul style="list-style-type: none"> • Leading edge • Trailing edge • Chord • Upper and lower camber • Flaps and trim tabs • Ailerons and rudders • Helicopter/rotor wing
2.4 Identify specific aircraft handling characteristics	<ul style="list-style-type: none"> • Left turning tendency • P-factor • Torque • Fixed wing • Rotor wing • Tilt rotor • Turboprop

	<ul style="list-style-type: none"> • Jet
STANDARD 3.0 INVESTIGATE FEDERAL AVIATION REGULATIONS (FAR) AND OTHER REQUIREMENTS	
3.1 Define acronyms and terms most frequently used for reference documents and in pilot/controller communications [e.g., those listed in the CFR (Code of Federal Regulation), AIM (Aeronautical Information Manual), and the Lexicon of the ICAO (International Civil Aviation Organization)]	<ul style="list-style-type: none"> • Acronyms and terms listed in the: <ul style="list-style-type: none"> ◦ CFR (Code of Federal Regulation) <ul style="list-style-type: none"> ▪ Part 61 ▪ Part 91 ▪ Part 107 ◦ AIM (Aeronautical Information Manual) ◦ The Lexicon of the ICAO (International Civil Aviation Organization) • Federal Aviation Administration Order (FAAO) <ul style="list-style-type: none"> ◦ 7110.65 Air Traffic Control
3.2 Describe the general content of section and parts of the CFR that pertain to the aviation industry [ref. 14 CFR Section A, Parts 1, 43, 61, 65, 67, 91, and 121; NTSB (National Transportation Safety Board) Part 830; and 49 CFR 1552-TSA (Transportation Safety Administration) Regulations]	<ul style="list-style-type: none"> • CFR (Code of Federal Regulation) <ul style="list-style-type: none"> ◦ Part 61 ◦ Part 91 ◦ Part 107 • NTSB (National Transportation Safety Board) Part 830
3.3 Explain Aircraft Certificates and Documents, their operating limitations, placards, and markings, including the medical certificate class and duration (e.g., Certificate of Airworthiness, Certificate of Registration, Journey Log, Pilot Operating Handbook, Pilot License, Radio Operator's License, Interception Signals, and Weight and Balance Report)	<ul style="list-style-type: none"> • Certificate of Airworthiness • Certificate of Registration • Journey Log <ul style="list-style-type: none"> ◦ Logbook entries • Pilot Operating Handbook • Pilot License/Drone Operator Certificate/ATC Certification • Radio Operator's License • Interception Signals • Weight and Balance Report • Medical flight certificate <ul style="list-style-type: none"> ◦ Class types
3.4 Explain airworthiness requirements (e.g., day and night Visual Flight Rules, airworthiness compliance records, and airworthiness with inoperative instruments and equipment)	<ul style="list-style-type: none"> • Day and night Visual Flight Rules • Airworthiness compliance records/directives • Airworthiness with inoperative instruments and equipment • Maintenance records
3.5 List the general eligibility requirements for a private pilot certificate (ref. 14 CFR/FAR 61.103)	<ul style="list-style-type: none"> • Private pilot certificate requirements <ul style="list-style-type: none"> ◦ Medical ◦ Dual instruction hours ◦ Solo ◦ Cross country flight

	<ul style="list-style-type: none"> ○ Nighttime training ● Drone/remote pilot certificate requirements
3.6 Compare and contrast requirements for a private pilot certificate with requirements for other pilot certificates and ratings (i.e., student, sport, recreational, instrument, commercial, type, airline transport pilot certificates, etc.)	<ul style="list-style-type: none"> ● Student ● Sport ● Recreational ● Instrument ● Commercial ● Type ● Airline transport pilot certificates
3.7 Identify and describe required documents that an airman must present for inspection upon reasonable, authorized requests (i.e., airman certificate, medical certificate, aircraft records, airworthiness documentation, etc.)	<ul style="list-style-type: none"> ● Airman certificate ● Medical certificate ● Aircraft records ● Airworthiness documentation ● Drone Registration Part 107
STANDARD 7.0 DEMONSTRATE SAFETY IN AVIATION	
7.1 Apply safety to aircraft ground handling operations	<ul style="list-style-type: none"> ● Ramp rules and procedures ● Emergency locator transmitter service, replacement, and testing ● Foreign Object and Debris (FOD) and FOD Boxes ● Ground handling signals
7.2 Apply shop safety rules and regulations [FOD, tool accountability (usage, calibration, maintenance, storage), PPE, and hazmat]	<ul style="list-style-type: none"> ● Foreign Object and Debris (FOD) ● Tool accountability <ul style="list-style-type: none"> ○ Usage, calibration, maintenance, storage ● Personal Protective Equipment (PPE) ● Hazardous materials (Hazmat)
7.3 Apply principles of ANALYZE flight safety (air and ground operations)	<ul style="list-style-type: none"> ● DECIDE <ul style="list-style-type: none"> ○ Detect, Estimate, Choose, Identify, Do, Evaluate ● Aeronautical Decision Making (ADM) <ul style="list-style-type: none"> ○ Part 107

Domain 4: History

Instructional Time: 5 - 10%

STANDARD 1.0 INVESTIGATE THE HISTORY AND GROWTH OF THE AEROSPACE INDUSTRY

1.1 Discuss the birth of flight, including aviation's early pioneers	<ul style="list-style-type: none">• Myth of Icarus• Wright Brothers• Date of moon landing - 1969
1.2 Identify the historical factors influencing the growth of aviation	<ul style="list-style-type: none">• Juan Tripp (Pan Am)• Howard Hughes (Hughes Industries)• World Wars
1.3 Discuss the role of government in the growth and development of aviation	<ul style="list-style-type: none">• NASA (National Aeronautics and Space Administration)• Airline Deregulation Act - 1978• Federal Aviation Administration (FAA)• SpaceX
1.4 Examine current challenges and opportunities in the further development of aviation	<ul style="list-style-type: none">• Federal Aviation Administration (FAA)• SpaceX• Integration of Small Unmanned Aircraft System (sUAS) into national airspace• Next-Gen Air Transportation System (NextGen)

