Airman Certification Standards - Powerplant

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The following subject order reflects logical grouping and structural clarity and is not intended to prescribe instructional sequence or curriculum design.

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*Note: Content moved. Individual ACS subject no longer needed.

Legend:

Blue = Item changed

Green = New item

[1] Subject A. Reciprocating Engines	
Competencies	Fundamentals, Operation, and Engine Systems *Demonstrate the ability to inspect, evaluate, and verify reciprocating engine components, controls, and operational parameters in accordance with manufacturer data and safe maintenance practices.* Induction, Cooling, and Airflow Management *Demonstrate the ability to inspect and verify reciprocating engine air system components, airflow management hardware, and anti ice and induction air systems in accordance with manufacturer data and safe maintenance practices.* Fuel and Fuel Metering Systems *Demonstrate the ability to inspect, service, and evaluate reciprocating-engine fuel-metering components and fuel control systems in accordance with manufacturer data and safe maintenance practices.* Exhaust Systems *Demonstrate the ability to inspect and evaluate reciprocating engine exhaust system components, heat exchanger assemblies, and noise suppression hardware to determine their condition, security, and suitability for continued operation in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
.....	**Fundamentals and Operation**
.....	***Engine Theory and Principles***
AM.III.A.K.3.	Explain internal combustion engine operating principles.
AM.III.A.K.2.	Explain reciprocating engine operating principles.
AM.III.A.K.10.	Explain diesel engine operating principles.
.....	***Engine Types and Construction***
AM.III.A.K.1.	Identify types and configurations of reciprocating engines.
AM.III.A.K.4.	Describe horizontally opposed engine construction and internal components.
.....	***Engine Performance***
AM.III.A.K.7.	Analyze reciprocating engine performance parameters.
.....	***Maintenance, Inspection, and Ground Operations***
AM.III.A.K.8.	Describe reciprocating engine maintenance and inspection requirements.
AM.III.C.K.7.	Describe reciprocating engine mount types, hardware, and inspection requirements.
AM.III.A.K.9.	Apply reciprocating engine ground operation principles, including safety considerations.
AM.III.A.K.6.	Describe reciprocating engine storage and preservation requirements.
.....	**Fuel and Fuel Metering Systems**
.....	***Fundamental Principles***
AM.III.I.K.1.	Analyze fuel air ratio and fuel metering principles, including how metering devices regulate mixture.

[1] Subject A. Reciprocating Engines	
.....	***Carburetion***
.....	Describe carburetor types, components, and operating principles.
AM.III.I.K.2.	Describe float carburetor components and operating principles.
.....	Apply float carburetor maintenance principles, including float level and mixture adjustments.
AM.III.J.K.7.	Explain carburetor heat system purpose and operation.
.....	***Fuel Injection***
AM.III.I.K.4.	Describe continuous flow fuel injection system types, components, and operating principles.
.....	Apply fuel injection system maintenance principles, including adjustments and troubleshooting considerations.
.....	***Fuel System Operation***
AM.III.I.K.10.	Analyze fuel system operation, including flow paths and system behavior under varying conditions.
.....	***Fuel System Inspection and Maintenance***
AM.III.I.K.9.	Describe fuel system inspection requirements for lines, valves, pumps, and filters.
.....	***Fuel Heaters***
AM.III.I.K.11.	Describe fuel heater types, purpose, and operating principles.
.....	**Induction and Cooling Systems**
.....	***Fundamentals***
AM.III.J.K.1.	Explain induction and cooling system operating principles and airflow characteristics.
AM.III.J.K.6.	Describe induction air filtering methods and components.
AM.III.J.K.2.	Analyze causes, effects, and indications of induction system icing.
.....	***Cooling System Fundamentals***
AM.III.J.K.8.	Describe pressure cowling airflow and cooling air management.
AM.III.J.K.9.	Describe baffle and seal installation principles and airflow considerations.
AM.III.J.K.10.	Explain liquid cooling system components and operating principles.
.....	***Forced Induction***
AM.III.J.K.3.	Describe supercharger components and operating principles.
AM.III.J.K.4.	Describe turbocharger, intercooler, and wastegate operating principles.
.....	***Specialized Cooling Systems***
AM.III.J.K.5.	Describe augmenter cooling system purpose and airflow characteristics.
.....	**Exhaust Systems**
AM.III.L.K.1.	Describe reciprocating engine exhaust system types, purpose, and operating principles.
.....	Describe exhaust system components and their functions.
.....	Analyze cabin heat exchanger operation and associated carbon monoxide hazards.
.....	Apply exhaust system inspection and maintenance principles, including safety precautions.

[1] Subject A. Reciprocating Engines	
AM.III.L.K.3.	Describe noise suppression components and regulatory considerations for reciprocating engine exhaust systems.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.A.R.1.	Propeller movement during maintenance.
AM.III.C.R.2.	Operation of the engine during maintenance.
AM.III.C.R.1.	Hot surface exposure during compression checks.
AM.III.I.R.2.	Improper idle-mixture adjustment.
AM.III.I.R.3.	Improper removal or installation of fuel metering components.
AM.III.I.R.4.	Maintenance near ignition sources with pressurized fuel systems.
.....	Exposure to residual fuel during maintenance.
AM.III.J.R.3.	Foreign object damage during induction or cooling system maintenance.
AM.III.L.R.3.	Operation of engines with exhaust system leaks.
.....	Internal muffler failures affecting exhaust integrity.
AM.III.J.R.4.	Chemicals used in liquid cooling systems.
	Storede nergy release during cylinder pressurization.
Skills	***The applicant demonstrates the ability to:***
.....	**Fundamentals and Operation**
AM.III.A.S.8.	Locate top dead center for the number one cylinder in accordance with manufacturer data.
AM.III.A.S.3.	Install a piston and wrist pin in accordance with manufacturer data.
AM.III.A.S.9.	Install a cylinder on a horizontally-opposed engine in accordance with manufacturer data.
AM.III.A.S.1.	Inspect a cylinder assembly for serviceability.
AM.III.C.S.1.	Perform a cylinder compression check in accordance with manufacturer data.
AM.III.A.S.7.	Inspect and rig engine controls in accordance with manufacturer data.
AM.III.C.S.14.	Inspect an engine mount for serviceability.
AM.III.C.S.9.	Inspect an engine for leaks after maintenance.
.....	Troubleshoot reciprocating engine operational faults in accordance with manufacturer data.
AM.III.C.S.12.	Perform an engine start and verify engine operational parameters.
.....	**Fuel and Fuel Metering Systems**
AM.III.I.S.1.	Inspect a continuous-flow fuel injection system for leaks, security, and condition.
.....	Troubleshoot continuous flow fuel injection system faults in accordance with manufacturer data.
AM.III.I.S.20.	Inspect a fuel boost pump for leaks, security, and operation.
AM.III.I.S.24.	Inspect engine fuel system lines and components for leaks, security, and condition.
AM.III.I.S.29.	Inspect a fuel selector valve for proper operation.
AM.III.I.S.23.	Adjust fuel pump pressure in accordance with manufacturer data.
AM.III.I.S.16.	Remove and install an engine-driven fuel pump.
AM.III.I.S.9.	Remove and install a float-type carburetor.
AM.III.I.S.27.	Service an engine fuel filter in accordance with manufacturer data.

[1] Subject A. Reciprocating Engines	
AM.III.I.S.25.	Troubleshoot abnormal fuel pressure indications in accordance with manufacturer data.
.....	**Induction and Cooling Systems**
AM.III.J.S.1.	Inspect a carburetor heat system for proper operation.
AM.III.J.S.5.	Service an induction air filter in accordance with manufacturer data.
AM.III.J.S.6.	Inspect a turbocharger for leaks, security, and condition.
AM.III.J.S.7.	Inspect and service a turbocharger wastegate in accordance with manufacturer data.
AM.III.J.S.8.	Inspect an induction system for obstruction and security.
AM.III.J.S.11.	Inspect engine cooling system ducting, baffles, and seals for condition and security. system ducting, baffles, and seals for condition and security.
AM.III.J.S.18.	Inspect a cowl flap system for proper operation.
.....	**Exhaust Systems**
AM.III.L.S.3.	Inspect a reciprocating engine exhaust system for leaks, security, and condition.
AM.III.L.S.4.	Inspect exhaust system baffles or diffusers for condition and security.
AM.III.L.S.5.	Inspect an exhaust heat exchanger for leaks, security, and condition.
AM.III.L.S.7.	Perform an exhaust system pressure leak check in accordance with manufacturer data.

[2] Subject B. Turbine Engines	
Competencies	Fundamentals, Operation, and Engine Systems *Demonstrate the ability to inspect, evaluate, and verify turbine engine components, controls, and operational parameters in accordance with manufacturer data and safe maintenance practices.* Turbine Engine Air Systems *Demonstrate the ability to inspect and verify turbine engine air system components, airflow management hardware, and anti ice and bleed air systems in accordance with manufacturer data and safe maintenance practices.* Fuel and Fuel Metering Systems *Demonstrate the ability to inspect, service, and evaluate turbine engine fuel metering components, fuel control systems, and associated hardware in accordance with manufacturer data and safe maintenance practices.* Exhaust Systems *Demonstrate the ability to inspect turbine engine exhaust system components and verify their condition, security, and suitability for continued operation in accordance with manufacturer data and safe maintenance practices.* Thrust Reverser Systems *Demonstrate an understanding of turbine engine thrust reverser system theory, components, and indications in accordance with manufacturer data and safe operational practices.*
Knowledge	***Knowledge Learning Objectives:***
.....	**Fundamentals & Operation**
AM.III.B.K.1.	Explain turbine engine operating principles and theory of operation.
AM.III.B.K.2.	Identify types of turbine engines and their distinguishing characteristics.
AM.III.B.K.3.	Describe turbine engine construction and internal components.
AM.III.B.K.4.	Explain turbine engine performance parameters and associated monitoring methods.
AM.III.B.K.7.	Identify common causes of turbine engine performance loss.
.....	Explain turbine engine rigging concepts and their purpose.
AM.III.B.K.6.	Explain post installation turbine engine operational checks and their purpose.
AM.III.B.K.5.	Describe common turbine engine troubleshooting indicators and inspection considerations.
AM.III.B.K.9.	Describe turbine engine storage and preservation concepts.
AM.III.B.K.10.	Explain the purpose, components, and operation of auxiliary power units (APUs).
AM.III.C.K.7.	Describe turbine engine mounts, mounting hardware, and associated inspection considerations.
.....	**Turbine Engine Air Systems**
AM.III.K.K..	Explain active turbine clearance control systems and their purpose.
AM.III.K.K.1.	Describe turbine engine internal air cooling system theory, components, and operation.
AM.III.K.K.2.	Explain turbine engine cowling airflow paths and their purpose.

[2] Subject B. Turbine Engines	
AM.III.K.K.3.	Describe turbine engine internal cooling methods and airflow paths.
AM.III.K.K.4.	Explain the purpose and function of turbine engine baffles and seals.
AM.III.K.K.5.	Describe turbine engine insulation blankets and shrouds and their purpose.
AM.III.K.K.6.	Explain turbine engine induction system theory, components, and operation.
AM.III.K.K.7.	Explain turbine engine bleed air system theory, components, and operation as they apply to engine mounted bleed air sources.
AM.III.K.K.8.	Describe turbine engine anti ice system purpose, components, and operation as they apply to engine mounted anti ice systems.
AM.III.B.K.8.	Identify common engine mounted bleed air system applications and functions.
.....	**Fuel & Fuel Metering**
AM.III.I.K.8.	Describe turbine engine fuel metering system theory, components, and operation.
AM.III.I.K.6.	Describe hydromechanical fuel control system design features, components, and operating principles.
AM.III.I.K.5.	Explain digital engine control system types, major components, functions, and advantages.
AM.III.I.K.7.	Describe fuel nozzle and manifold design features and operation.
.....	**Turbine Engine Exhaust Systems**
AM.III.L.K.2.	Explain turbine engine exhaust system types, purpose, and functions.
.....	Describe exhaust system components and their purpose, construction, and thermal characteristics.
.....	Explain exhaust system operation, including heat and pressure flow characteristics.
.....	Describe exhaust system inspection considerations, maintenance concepts, and safety precautions.
.....	Explain exhaust noise suppression theory, components, and operation. suppression theory, components, and operation.
.....	**Turbine Engine Thrust Reverser Systems**
AM.III.L.K.4.	Explain thrust reverser system theory and operation, including thrust vectoring principles.
.....	Describe thrust reverser system components and their purpose and function.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
.....	**Fundamentals & Operation**
.....	Incorrect interpretation of turbine engine operating principles.
.....	Improper rigging or adjustment.
.....	Improper installation or post installation checks. installation checks.
.....	Improper recognition of turbine engine performance loss factors.
.....	**Air Systems**
.....	Improper handling or installation of airflow management components. management components.
.....	Improper operation or maintenance of anti-ice or bleed air systems.
.....	Improper servicing or inspection of internal cooling or clearance control systems.

[2] Subject B. Turbine Engines	
.....	**Fuel & Fuel Metering**
AM.III.I.R.1.	Improper calibration or adjustment of fuel control systems.
AM.III.I.R.5.	Improper handling or transport of fuel control units.
.....	Improper operation or troubleshooting of fuel metering systems.
.....	Improper operation, adjustment, or maintenance of digital or hydromechanical fuel controls.
.....	Improper handling, cleaning, or installation of fuel nozzles or manifolds.
.....	**Engine Exhaust Systems**
.....	Improper installation or security of exhaust components.
.....	Improper identification of thermal distress, cracking, or deformation of exhaust components.
.....	Improper handling or installation of noise suppression or mixer components. suppression or mixer components.
.....	Improper identification of exhaust system restrictions or obstructions. system restrictions or obstructions.
.....	**Thrust Reverser Systems**
.....	Improper operation, rigging, or maintenance of thrust-reverser systems.
.....	Improper interpretation of thrust reverser system indications. reverser system indications.
Skills	***The applicant demonstrates the ability to:***
.....	**Fundamentals & Operation**
AM.III.B.S.6.	Inspect a combustion liner for condition and serviceability.
AM.III.B.S.13.	Inspect the first two stages of a turbine fan or compressor for foreign object damage.
AM.III.C.S.14.	Inspect an engine mount for condition and serviceability.
AM.III.C.S.9.	Inspect an engine for leaks following maintenance.
AM.III.C.S.8.	Verify engine control operation and adjustment.
AM.III.C.S.12.	Evaluate turbine engine operational parameters.
AM.III.B.S.8.	Inspect inlet guide vanes and compressor blades for condition and serviceability.
.....	**Air Systems**
AM.III.K.S.1.	Inspect the induction and cooling system.
AM.III.K.S.4.	Inspect cooling ducting and baffle seals for condition and security.
AM.III.K.S.5.	Inspect a turbine engine air intake anti-ice system for condition.
AM.III.K.S.8.	Inspect a bleed air system for leaks, condition, and security.
.....	**Fuel & Fuel Metering**
AM.III.I.S.2.	Remove, inspect, and install a turbine engine fuel nozzle.
AM.III.I.S.30.	Evaluate a fuel nozzle spray pattern for correctness.
.....	**Turbine Engine Exhaust Systems**
AM.III.L.S.2.	Inspect turbine engine exhaust system components for condition and security.

[3] Subject M. Propellers	
Competencies	*Demonstrate the ability to inspect, service, and evaluate propeller systems, components, and operational characteristics in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
AM.III.M.K.2.	Describe common propeller types and their operational characteristics.
.....	Explain propeller construction features and design considerations.
AM.III.M.K.1.	Explain propeller thrust generation and aerodynamic blade behavior.
.....	Describe the relationship between blade pitch and propeller performance
AM.III.M.K.3.	Identify propeller pitch control settings.
.....	Explain how pitch settings affect thrust, engine load, and efficiency.
AM.III.M.K.4.	Describe constant speed propeller system operation.
.....	Explain governor mechanisms.
AM.III.M.K.5.	Explain beta and reverse thrust modes in turbine propeller systems.
.....	Describe blade angle transitions and throttle lever control logic.
AM.III.M.K.6.	Describe propeller servicing and routine maintenance requirements.
.....	Identify inspection requirements for determining propeller condition and airworthiness.
AM.III.M.K.7.	Explain manufacturer approved procedures for propeller removal and installation.
AM.III.M.K.9.	Describe propeller synchronization and synchrophasing system operation.
.....	Explain beat frequency effects and phase angle adjustments.
AM.III.M.K.10.	Describe propeller anti icing and de icing system technologies.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.M.R.1.	Unsafe acts when working around propellers.
AM.III.M.R.2.	Improper or incomplete propeller maintenance and inspections.
Skills	***The applicant demonstrates the ability to:***
AM.III.M.S.4.	Measure propeller blade angle in accordance with approved procedures.
AM.III.M.S.2.	Check propeller blade tracking and evaluate results.
AM.III.M.S.3.	Inspect a propeller for condition and airworthiness in accordance with manufacturer data.
AM.III.M.S.6.	Perform propeller lubrication in accordance with approved procedures.
AM.III.M.S.5.	Perform a manufacturer approved minor repair to a metal propeller blade.
AM.III.M.S.1.	Remove and install a fixed pitch propeller in accordance with manufacturer approved procedures.
AM.III.M.S.4.	Measure propeller blade angle in accordance with approved procedures.

[4] Subject G. Engine Lubrication Systems	
Competencies	*Demonstrate the ability to inspect, service, and evaluate engine lubrication system components, flow paths, and contamination control features in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
.....	**Lubrication Fundamentals**
AM.III.G.K.1.	Describe engine oil functions, types, grades, and characteristics.
.....	Explain friction types and their relevance to engine operation.
.....	**Lubrication System Types & Operation**
AM.III.G.K.2.	Differentiate wet-sump and dry-sump lubrication systems by configuration, operation, and application in reciprocating and turbine engines.
.....	Explain lubrication system components and their purpose, function, and operation.
.....	**Lubrication System Indications**
AM.III.G.K.5.	Describe oil system indications, including pressure, temperature, quantity, and chip detection.
.....	**Lubrication System Maintenance & Analysis**
AM.III.G.K.6.	Describe lubrication system maintenance, inspection, and servicing requirements.
.....	Explain engine oil pressure regulation methods, including relief valve operation and adjustment considerations.
.....	Explain the purpose of oil analysis and the identification of wear metals and associated engine conditions.
.....	**Lubrication System Maintenance & Analysis**
AM.III.G.K.6.	Describe lubrication system maintenance, inspection, and servicing requirements.
.....	Explain engine oil pressure regulation methods, including relief valve operation and adjustment considerations.
.....	**Lubrication System Fault Recognition**
.....	Identify common lubrication system faults using system indications, schematics, and diagnostic tools.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.G.R.1.	Incorrect lubrication system servicing, including contamination, improper oil quantity, or failure to secure components.
AM.III.G.R.3.	Improper handling, storage, or disposal of lubricating oil, including environmental and fire hazards.
.....	Failure to identify abnormal oil system indications, including pressure, temperature, quantity, and chip detection.
.....	Installation errors involving oil filters, screens, lines, or fittings.
Skills	***The applicant demonstrates the ability to:***
AM.III.G.S.3.	Check an engine oil filter bypass indicator for status in accordance with manufacturer data.
AM.III.G.S.2.	Select the correct engine oil type and grade for expected ambient temperatures in accordance with manufacturer data to service an engine.
AM.III.G.S.1.	Inspect an oil cooler and associated lines for condition, security, and leaks.

[4] Subject G. Engine Lubrication Systems	
AM.III.G.S.6.	Inspect an oil filter or screen for condition, contamination, and proper installation.
AM.III.G.S.7.	Perform an engine oil pressure adjustment in accordance with manufacturer data.
AM.III.G.S.9.	Replace a lubrication system component and verify correct installation in accordance with manufacturer data.
AM.III.G.S.14.	Remove and inspect an engine chip detector for contamination and proper operation.
AM.III.G.S.11.	Troubleshoot an engine lubrication system malfunction using system indications, schematics, and diagnostic tools.

[5] Subject H. Ignition and Starting Systems	
Competencies	**Ignition Systems** *Inspect, service, and evaluate engine ignition system components and operational characteristics in accordance with manufacturer data and safe maintenance practices.* **Starting Systems** *Inspect and evaluate engine starting system components and verify proper operation in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
.....	**Starting System Fundamentals**
AM.III.H.K.7.	Describe starting system purpose, major types, and operation.
.....	Explain starting system integration with ignition, fuel delivery, and engine control systems.
.....	**Starting System Maintenance & Fault Recognition**
.....	Describe maintenance and inspection requirements for starting systems.
.....	Explain common starting system faults and their system-level indications.
.....	**Ignition System Fundamentals**
AM.III.H.K.1.	Describe ignition system purpose, function, and role in initiating combustion for reciprocating and turbine engines.
.....	Differentiate mechanical and electronic ignition systems by power source, control method, and application.
.....	Explain magneto ignition system components and operational principles.
.....	Describe magneto timing concepts, including impulse coupling and retard breaker operation.
.....	Describe battery-powered ignition system characteristics and applications.
AM.III.H.K.5.	Explain solid-state ignition system components, operation, and applications.
AM.III.H.K.6.	Explain electronic ignition system types, components, and operational principles, including CDI, digital control modules, and FADEC.
.....	**Ignition System Maintenance, Integration & Fault Recognition**
.....	Describe ignition system maintenance and inspection requirements.
.....	Explain ignition system integration with starting, fuel delivery, and engine control systems.
.....	Identify common ignition system faults and their system-level indications.
.....	**Ignition Safety & Spark Plug Concepts**
.....	Identify hazards associated with high-voltage ignition components and required safety precautions.
AM.III.H.K.2.	Explain spark plug construction, operation, and performance characteristics.
.....	Describe spark plug maintenance and inspection requirements.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.H.R.1.	Electrical hazards associated with ignition and starting system maintenance.

[5] Subject H. Ignition and Starting Systems	
.....	Mechanical and operational hazards associated with ignition and starting system components.
.....	Fuel vapor ignition hazards associated with ignition sources near fuel system maintenance areas.
Skills	***The applicant demonstrates the ability to:***
.....	**Starting System**
AM.III.H.S.5.	Inspect an electrical starting system using manufacturer data.
AM.III.H.S.9.	Troubleshoot an electrical starting system using wiring diagrams and test equipment.
.....	**Ignition System - Reciprocating Engines**
AM.III.H.S.1.	Perform magneto internal timing using manufacturer data.
AM.III.H.S.2.	Perform magneto-to-engine timing using manufacturer data.
AM.III.H.S.6.	Inspect magneto breaker points for condition and serviceability.
AM.III.H.S.8.	Inspect a magneto impulse coupling for condition and operation.
AM.III.H.S.7.	Inspect an ignition harness for condition, routing, and security.
AM.III.H.S.17.	Inspect igniters for condition and serviceability.
AM.III.H.S.3.	Service a spark plug in accordance with manufacturer data.
AM.III.H.S.10.	Troubleshoot an ignition switch circuit using wiring diagrams and test equipment.
.....	**Ignition System - Turbine Engines**
AM.III.H.S.16.	Inspect a turbine engine ignition system using manufacturer data.
AM.III.H.S.14.	Replace turbine engine igniter plugs and verify installation using manufacturer data.
AM.III.H.S.15.	Troubleshoot turbine engine ignition components using wiring diagrams and test equipment.
AM.III.H.S.13.	Troubleshoot reciprocating or turbine engine ignition systems using manufacturer data and appropriate test equipment.

[6] Subject F. Engine Electrical Systems	
Competencies	*Demonstrate the ability to inspect, evaluate, and verify engine electrical system components, wiring, and power generation equipment in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
	Power Generation & Regulation
.....	Explain the operating principles of engine mounted AC and DC generators, including IDG and CSD integration.
.....	Describe GCU functions including voltage and frequency regulation, load sharing, and fault isolation.
.....	Explain mechanical and lubrication factors affecting IDG performance, including common electrical failure modes.
.....	Describe installation, inspection, and verification requirements for engine mounted generators.
.....	Identify common generator, alternator, and IDG fault indicators and their associated corrective actions.
AM.III.F.K.8.	Explain generator paralleling concepts and the effects of incorrect polarity or grounding.
	Engine Electrical Wiring, Connectors, & Installation
.....	Explain routing, protection, and environmental considerations for engine mounted electrical wiring.
AM.III.F.K.7.	Describe wire gauge, insulation, and installation requirements for engine mounted electrical wiring.
.....	Describe inspection considerations for engine electrical connectors, harnesses, and repairs.
	Switches & Protective Devices
.....	Describe switch and protective device types, functions, and applications in engine electrical systems.
.....	Explain selection and installation considerations for switches and protective devices.
.....	Identify common failure modes associated with switches and protective devices.
	System Integration & Engine-Specific Electrical Behavior
.....	Explain system level electrical interactions including polarity, grounding, and connector considerations.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.F.R.1.	Incorrect polarity, grounding, or connector orientation.
AM.III.F.R.3.	Failure to verify circuit energy state.
AM.III.F.R.4.	Improper routing or support of engine mounted electrical wiring.
.....	Incorrect switch or protective device selection.
.....	Failure to identify abnormal generator or alternator output conditions.
Skills	***The applicant demonstrates the ability to:***
	Power Generation & Regulation
AM.III.F.S.14.	Inspect and test engine mounted DC and AC power generation components in accordance with manufacturer data.

[6] Subject F. Engine Electrical Systems	
AM.III.F.S.3.	Remove and install engine mounted generators or alternators and perform post installation operational checks.
.....	Inspect generator or alternator output for correct voltage, frequency, and phase stability.
AM.II.K.S.13.	Inspect generator brushes and brush spring tension for serviceability.
.....	Troubleshoot DC and AC power generation system faults in accordance with manufacturer data.
	IDG Systems & Regulation
.....	Inspect and test an Integrated Drive Generator (IDG) system in accordance with manufacturer data.
.....	Troubleshoot IDG regulation and control system faults in accordance with manufacturer data.
.....	Verify mechanical and electrical integration of an IDG with engine accessory systems.
	Wiring, Connectors & Installation
AM.III.F.S.9.	Select the appropriate wire gauge for an engine mounted electrical component in accordance with manufacturer data.
AM.III.F.S.10.	Repair engine mounted electrical wiring and perform a post repair functional test.
.....	Perform continuity and insulation resistance tests on engine mounted electrical wiring.
AM.III.F.S.11.	Remove and replace lacing or securing materials on an engine mounted electrical wire bundle.
	Switches & Protective Devices
AM.III.F.S.1.	Inspect and test engine mounted electrical wiring, connectors, switches, and protective devices.
.....	Remove and replace an overvoltage or overcurrent protection device and verify proper operation.
	System Troubleshooting & Integration
AM.III.F.S.12.	Troubleshoot engine electrical system faults using wiring diagrams and manufacturer data.
AM.III.F.S.5.	Troubleshoot engine mounted power generation system faults using diagnostic tools and manufacturer data.
AM.III.F.S.4.	Perform post maintenance operational checks on an engine electrical system.

[7] Subject D. Engine Instruments	
Competencies	*Demonstrate the ability to inspect, evaluate, and verify engine instrument systems, sensors, and indications in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
.....	Explain the purpose and function of engine indicating systems.
AM.III.D.K.11.	Interpret engine instrument range markings and limitations.
AM.III.D.K.8.	Analyze engine related annunciations within EICAS, ECAM, and similar alerting systems.
.....	Explain how FADEC and digital engine controls generate, process, and transmit engine indication data.
AM.III.D.K.2.	Analyze temperature indications to identify abnormal trends and potential engine conditions.
AM.III.D.K.4.	Interpret pressure indications to assess engine health and system performance.
AM.III.D.K.3.	Explain the relationship between speed indications and engine operating conditions.
AM.III.D.K.1.	Interpret flow and ratio indications to evaluate engine performance and power output.
.....	Analyze engine vibration indications to identify potential mechanical or rotating group issues.
.....	Identify and classify engine mounted sensors, probes, and transducers by function and indication type.
.....	Explain engine side wiring harness routing, shielding, and protection requirements.
.....	Differentiate engine side indication system components by function and data output.
.....	Analyze engine indication parameters to identify abnormal trends and potential engine conditions.
.....	Analyze abnormal engine indications to determine probable system faults or developing conditions.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.D.R.1.	Damage to engine sensors, probes, or wiring during removal, installation, or inspection.
AM.III.D.R.2.	Incorrect installation of thermocouples, pressure transducers, or tachometer pickups.
.....	Misinterpretation of engine indications resulting in improper troubleshooting or unsafe engine operation.
.....	Contamination, blockage, or leakage in engine pressure lines (fuel, oil, manifold) affecting indication accuracy.
.....	Failure to verify correct indication after FADEC, sensor, or display replacement.
Skills	***The applicant demonstrates the ability to:***
AM.III.D.S.13.	Inspect and test engine mounted sensors, probes, and transducers for condition, security, and correct operation.

[7] Subject D. Engine Instruments	
AM.III.D.S.6.	Perform electrical or thermocouple-based checks on engine indication circuits in accordance with manufacturer procedures.
AM.III.D.S.3.	Install engine side indication components and verify correct configuration in accordance with manufacturer procedures.
AM.III.D.S.11.	Troubleshoot engine indication systems for faults in sensors, wiring, or indication units using applicable data.

[8] Subject E. Engine Fire Protection Systems	
Competencies	*Demonstrate the ability to inspect, evaluate, and verify engine fire detection and extinguishing system components, routing, and indications in accordance with manufacturer data and safe maintenance practices.*
Knowledge	***Knowledge Learning Objectives:***
AM.III.E.K.1.	Describe fire zones associated with reciprocating and turbine engine installations, including their purpose and regulatory basis.
.....	**Engine Fire Detection Systems**
AM.III.E.K.2.	Describe engine fire detection and overheat system components and operation.
AM.III.E.K.3.	Explain maintenance and inspection requirements for fire detection and overheat systems.
.....	Interpret common engine fire detection system malfunctions using manufacturer data.
.....	**Engine Fire Extinguishing Systems**
AM.III.E.K.4.	Describe engine fire extinguishing system components, operation, and extinguishing agents.
AM.III.E.K.5.	Explain maintenance and inspection requirements for engine fire extinguishing systems.
.....	Interpret common engine fire extinguishing system malfunctions using manufacturer data.
Risk Management	***The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:***
AM.III.E.R.2.	Incorrect selection, storage, or handling of engine fire extinguishing equipment.
AM.III.E.R.1.	Improper handling or installation of engine fire extinguisher container discharge cartridges (squibs).
AM.III.E.R.3.	Maintenance induced faults in circuits associated with electrically activated discharge cartridges (squibs).
Skills	***The applicant demonstrates the ability to:***
.....	**Engine Fire Detection Systems**
AM.III.E.S.3.	Perform an operational check of an engine fire detection or protection system to verify correct system response.
AM.III.E.S.4.	Inspect thermal switch or thermocouple type fire detection systems for condition, installation, and proper operation.
AM.III.E.S.12.	Inspect flame detectors for condition and proper operation.
AM.III.E.S.13.	Check operation of the fire warning press to test for correct system response.
.....	**Engine Fire Extinguishing Systems**
AM.III.E.S.6.	Inspect fire extinguishing system discharge indicators to verify status.
AM.III.E.S.7.	Check an engine or APU fire extinguisher container pressure for compliance with specified limits.
AM.III.E.S.8.	Inspect a fire extinguisher discharge circuit for condition, routing, and security.
AM.III.E.S.10.	Inspect a fire extinguisher container discharge cartridge (squib) for condition, security, and installation.

[8] Subject E. Engine Fire Protection Systems	
AM.III.E.S.11.	Inspect a turbine engine fire extinguisher container for condition and serviceability, including hydrostatic test date compliance.
AM.III.E.S.1.	Troubleshoot an engine or APU fire detection or extinguishing system for a given malfunction using applicable data.