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SUBPART A – GENERAL

§ 147.1 Applicability.

This part prescribes the requirements for issuing aviation maintenance technician (AMT) school certificates and associated ratings, the general operating rules for the holders of those certificates and ratings, and operations specifications.

§ 147.3 Certificate and Operations Specifications Required.

No person may operate as a certificated AMT school without, or in violation of, an AMT school certificate and operations specifications issued under this part.

§ 147.5 Application and Issue.

(a) An application for a certificate and rating, or for an additional rating, under this part is made on a form and in a manner prescribed by the President and must be accompanied by:

(1) Evidence that the appropriate fee has been paid in accordance with the Implementing Regulations of the Civil Aviation Tariff Act;

(2) The applicant's training and procedures manual;

(3) A description of the proposed curriculum;

(4) A list of the facilities and materials to be used;

(5) A list of its instructors, including the kind of certificate and ratings held and the certificate numbers; and

(6) A statement of the maximum number of students it expects to teach at any one time.

(b) An applicant who meets the requirements of this part may be issued an AMT school certificate and associated ratings prescribing such operations specifications and limitations as are necessary in the interests of safety.

§ 147.7 Training and Procedures Manual.

(a) Each AMT school must prepare and maintain a training and procedures manual, acceptable to the President, for the use of the AMT school's personnel.

(b) The training and procedures manual required under paragraph (a) of this section must contain the following information:

(1) A general description of the AMT school's scope of training authorized under the school's certificate and operations specifications;

(2) A description of the proposed curriculum;

(3) A list of the facilities and materials to be used;

(4) A description of the AMT school's quality assurance system under General Authority of Civil Aviation (GACA) Regulation (GACAR) § 147.71;

(5) An organizational chart showing the names, duties, and qualifications of the person(s) responsible for compliance under Subpart D of this part.

(6) A list of its instructors, including the kind of certificate and ratings held and the certificate numbers;

(7) A description of the procedures used to establish and maintain the competence of instructors;

(8) A description of the method used for the completion and retention of records required by Subpart G of this part.

(9) A statement of the maximum number of students it expects to teach at any one time.

(10) Copies of the certificate holder's operations specifications or appropriate extracted information.

(c) The AMT school must ensure that the training and procedures manual is amended as necessary to maintain current data.

(d) Copies of all amendments to the training and procedures manual must be distributed in a timely manner to all organizations or persons to whom the training and procedures manual has been issued.

§ 147.9 Duration of Certificate.

(a) A certificate or rating issued under this part is effective until—

(1) The period of validity stated on the certificate or rating expires,

(2) The AMT school surrenders the certificate or rating, or

(3) The GACA suspends or revokes the certificate or rating.

(b) The holder of a certificate that is surrendered, suspended, or revoked, must return it to the President.

(c) When a holder of a certificate issued under this part seeks reconsideration of a decision from the President concerning suspension, revocation, or amendment of a certificate, the procedures in GACAR Part 13 apply.

§ 147.11 Renewal of Certificate.

(a) An AMT school that applies for a renewal of its AMT school certification must submit its request for renewal, in a form and manner acceptable to the President, no later than 90 working days before its current certificate expires. If a request for renewal is not made within this period, the AMT school must follow the application procedures in GACAR § 147.5.

(b) An application for renewal must be accompanied by evidence that the appropriate fee has been paid in accordance with the Implementation Regulation of the Civil Aviation Tariff Act.

§ 147.12 Display of Certificate.

(a) Each holder of an AMT school certificate must display that certificate in a place in the school that is normally accessible to the public and is not obscured.

(b) A certificate must be made available for inspection upon request by—

(1) The President,

(2) An authorized representative of the Aviation Investigation Bureau (AIB), or

(3) Any law enforcement agency in the Kingdom of Saudi Arabia.

§ 147.13 Inspection.

The President may, at any time, inspect an AMT school to determine its compliance with this part.

§ 147.15 Advertising.

(a) A certificated AMT school may not make any statement relating to itself that is false or is designed to mislead any person considering enrollment therein.

(b) Whenever an AMT school indicates in advertising that it is a certificated school, it must clearly distinguish between its approved courses and those that are not approved.

§ 147.17 Ratings.

The following ratings are issued under this part:

(a) Airframe,

(b) Powerplant,

(c) Combined airframe and powerplant, and

(d) Avionics.

§ 147.19 Certificate Holder's Duty To Maintain Operations Specifications.

(a) Each holder of a certificate issued under this part must maintain a complete and separate set of its operations specifications at its principal operations base.

(b) Each holder of a certificate issued under this part must insert pertinent excerpts of, or references to, its operations specifications into its manual and must—

(1) Clearly identify each such excerpt as a part of its operations specifications and

(2) State that compliance with the operations specifications is mandatory.

(c) Each holder of a certificate issued under this part must keep each of its employees and other persons used in its operations informed of the provisions of its operations specifications that apply to that employee's or person's duties and responsibilities.

§ 147.21 Contents of Operations Specifications.

Each holder of a certificate issued under this part must obtain operations specifications containing

all of the following:

(a) The specific location of the certificate holder's principal operations base and, if different, the address that will serve as the primary point of contact for correspondence between the GACA and the certificate holder;

(b) The type of training authorized, including approved courses;

(c) The authorizations, limitations, and certain procedures under which each training program is to be conducted; and

(d) Any other item the President determines is necessary.

§ 147.23 Amending Operations Specifications.

(a) The President may suspend, revoke, amend, or modify any operations specifications issued under this part if—

(1) The President determines that aviation safety and the public interest require the amendment or

(2) The certificate holder applies for the amendment, and the President determines that aviation safety and the public interest allow the amendment.

(b) When the President initiates a suspension, revocation, or amendment of a certificate holder's operations specifications, the procedure in GACAR Part 13 applies.

(c) When the certificate holder applies for an amendment to its operations specifications, the following procedure applies:

(1) The holder of a certificate issued under this part must file an application to amend its operations specifications at least 15 working days before the date proposed by the applicant for the amendment to become effective, unless a shorter time is approved.

(2) If the GACA approves the amendment, following coordination with the certificate holder regarding its implementation, the amendment is effective on the date the President approves it.

SUBPART B – CURRICULUM REQUIREMENTS

§ 147.31 General Curriculum Requirements.

(a) An applicant for an AMT school certificate and rating, or for an additional rating, must have an approved curriculum designed to qualify its students to perform the duties of a mechanic for a particular rating or ratings.

(b) The curriculum must offer at least the following number of hours of instruction for the rating shown, and the instruction unit hour must not be less than 50 minutes in length:

(1) Airframe—1 150 hours (400 general plus 750 airframe),

(2) Powerplant—1 150 hours (400 general plus 750 powerplant),

(3) Combined airframe and powerplant—1 900 hours (400 general plus 750 airframe and 750 powerplant), and

(4) Avionics—1 150 hours (400 general plus 750 avionics).

(c) The curriculum must cover the subjects and items prescribed in Appendix B, C, D, or E to this part, as applicable. Each item must be taught to at least the indicated level of proficiency, as defined in Appendix A.

(d) The curriculum must show—

(1) The required practical projects to be completed;

(2) For each subject, the proportions of theory and other instruction to be given; and

(3) A list of the minimum required school tests to be given.

(e) Notwithstanding the provisions of paragraphs (a) through (d) of this section and GACAR § 147.17, the holder of a certificate issued under Subpart A of this part may apply for and receive approval of special courses in the performance of special inspection and preventive maintenance programs for a primary category aircraft type certificated under GACAR Part 21. The school may also issue certificates of competency to persons successfully completing such courses if all other

requirements of this part are met and the certificate of competency specifies the aircraft make and model to which the certificate applies.

§ 147.33 Maintenance of Curriculum Requirements.

(a) Each certificated AMT school must adhere to its approved curriculum. With approval by the President, curriculum subjects may be taught at levels exceeding those shown in Appendix A to this part.

(b) A school may not change its approved curriculum unless the change is approved in advance.

§ 147.35 Special Curriculums.

(a) An applicant for, or holder of, an AMT school certificate issued under this part may apply for approval to conduct a course for which a curriculum is not prescribed by this part.

(b) The course for which application is made under paragraph (a) of this section may be for airmen, material handlers, ground servicing personnel, security personnel, and others approved by the President.

(c) The President approves the course for which the application is made under this section if the AMT school or AMT school applicant shows that the course contains a curriculum that will achieve a level of competency equal to, or greater than, that required by the appropriate part of the GACAR for which the training course is to be provided.

SUBPART C – FACILITIES AND EQUIPMENT REQUIREMENTS

§ 147.41 Facilities, Equipment, and Material Requirements.

An applicant for an AMT school certificate and rating, or for an additional rating, must have at least the facilities, equipment, and materials specified in GACAR §§ 147.43 through 147.47 that are appropriate to the rating the applicant seeks.

§ 147.43 Space Requirements.

An applicant for an AMT school certificate and rating, or for an additional rating, must have such of the following properly heated, lighted, and ventilated facilities as are appropriate to the rating the applicant seeks and as the President determines are appropriate for the maximum number of students expected to be taught at any time:

(a) An enclosed classroom suitable for teaching theory classes.

(b) Suitable facilities, either central or located in training areas, arranged to assure proper separation from the working space, for parts, tools, materials, and similar articles.

(c) Suitable areas for application of finishing materials, including paint spraying.

(d) Suitable areas equipped with washtank and degreasing equipment with air pressure or other adequate cleaning equipment.

(e) Suitable facilities for running engines.

(f) Suitable areas with adequate equipment, including benches, tables, and test equipment, to disassemble, service, and inspect—

(1) Ignition, electrical equipment, avionics, and appliances;

(2) Carburetors and fuel systems; and

(3) Hydraulic and vacuum systems for aircraft, aircraft engines, and their appliances.

(g) Suitable space with adequate equipment, including tables, benches, stands, and jacks, for disassembling, inspecting, and rigging aircraft.

(h) Suitable space with adequate equipment for disassembling, inspecting, assembling, troubleshooting, and timing engines.

§ 147.45 Instructional Equipment Requirements.

(a) An applicant for an AMT school certificate and rating, or for an additional rating, must have such of the following instructional equipment as is appropriate to the rating the applicant seeks:

(1) Various kinds of airframe structures, airframe systems and components, powerplants, and powerplant systems, avionics, and components (including propellers), of a quantity and type suitable to complete the practical projects required by its approved curriculums.

(2) At least one aircraft of a type certificated under GACAR Part 21 with powerplant, propeller, instruments, navigation and communications equipment, landing lights, and other equipment and accessories on which a maintenance technician might be required to work and with which the technician should be familiar.

(b) The equipment required by paragraph (a) of this section need not be in an airworthy condition. However, if it was damaged, it must have been repaired enough for complete assembly.

(c) Airframes, powerplants, propellers, appliances, avionics, and components thereof, on which instruction is to be given, and from which practical working experience is to be gained, must be so diversified as to show the different methods of construction, assembly, inspection, and operation when installed in an aircraft for use. There must be enough units so that not more than eight students will work on any one unit at a time.

(d) If the aircraft used for instructional purposes does not have retractable landing gear and wing flaps, the school must provide training aids or operational mockups of them.

§ 147.47 Materials, Special Tools, and Shop Equipment Requirements.

An applicant for an AMT school certificate and rating, or for an additional rating, must have an adequate supply of material, special tools, and such of the shop equipment as are appropriate to the approved curriculum of the school and are used in constructing and maintaining aircraft, to assure that each student will be properly instructed. The special tools and shop equipment must be in satisfactory working condition for the purpose for which they are to be used.

SUBPART D – PERSONNEL REQUIREMENTS

§ 147.61 Appointment of Personnel.

(a) Each holder of a certificate issued under this part must appoint an accountable manager who has authority to ensure that all requirements of this part are met by the AMT school.

(b) Each holder of a certificate issued under this part must employ sufficient personnel for ensuring compliance with the requirements of this part, including the planning, performance, and supervision of training to be conducted.

§ 147.63 Instructor Requirements.

(a) Each AMT school, must provide the number of instructors holding appropriate mechanic certificates and ratings that the President determines necessary to provide adequate instruction and supervision of the students, including at least one such instructor for each 25 students in each shop class. However, the school may provide specialized instructors, who are not certificated mechanics, to teach mathematics, physics, basic electricity, basic hydraulics, drawing, and similar subjects. The school is required to maintain a list of the names and qualifications of specialized instructors, and upon request, provide a copy of the list to the President.

(b) Unless a lesser amount is agreed by the President, each instructor with a mechanic rating must have a minimum of 5 years work experience as a mechanic.

§ 147.65 Instructor Training.

An AMT school must provide procedures to ensure instructors receive initial and recurrent training appropriate to responsibilities. Training in knowledge and skills related to human factors principles must be included in both initial and recurrent training.

SUBPART E – QUALITY ASSURANCE SYSTEM

§ 147.71 Quality Assurance System.

(a) Each AMT school must establish a quality assurance system acceptable to the President. Management personnel responsible for the implementation and maintenance of the quality assurance system must be identified by the ATM school.

(b) The quality assurance system must address—

(1) Conduct and effectiveness of all training programs;

(2) Compliance and adequacy of curriculums;

(3) Conformity and security of the ATM school's recordkeeping system;

(4) Adequacy of facilities and equipment;

(5) Qualifications, eligibility, and ability of instructors; and

(6) Effectiveness of management, including delegation of authority and responsibility.

§ 147.73 Quality of Instruction.

Each certificated AMT school must provide instruction of such quality that, of its graduates of a curriculum for each rating who apply for a mechanic certificate within 60 days after they are graduated, the percentage of those passing the applicable GACA written tests on their first attempt is at least equal to 80%.

SUBPART F – OPERATING RULES

§ 147.81 Attendance and Enrollment, Tests, and Credit for Prior Instruction or Experience.

(a) A certificated AMT school may not require any student to attend classes of instruction more than 8 hours in any day or more than 6 days or 40 hours in any 7 day period.

(b) Each school must give an appropriate test to each student who completes a unit of instruction as shown in that school's approved curriculum. A grade of 70% is the minimum acceptable passing grade per unit of instruction.

(c) A school may not graduate a student unless he has completed all of the appropriate curriculum requirements with a minimum passing grade of 70% and 100% attendance. However, the school may credit a student with instruction or previous experience as follows:

(1) A school may credit a student with instruction satisfactorily completed at—

(i) An accredited university, college, or junior college;

(ii) An accredited vocational, technical, trade or high school;

(iii) An Armed Forces technical school; or

(iv) A certificated AMT school.

(2) A school may determine the amount of credit to be allowed—

(i) By an entrance test equal to one given to the students who complete a comparable required curriculum subject at the crediting school;

(ii) By an evaluation of an authenticated transcript from the student's former school; or

(iii) In the case of an applicant from an Armed Forces school, only based on an entrance test.

(3) A school may credit a student with previous aviation maintenance experience comparable to required curriculum subjects. It must determine the amount of credit to be allowed by documents verifying that experience, and by giving the student a test equal to the one given

to students who complete the comparable required curriculum subject at the school.

(4) A school may credit a student seeking an additional rating with previous satisfactory completion of the general portion of an AMT school curriculum.

(d) A school may not have more students enrolled than the number stated in its application for a certificate, unless it amends its application and has it approved.

(e) A school must use an approved system for determining final course grades and for recording student attendance. The system must show hours of absence allowed and show how the missed material will be made available to the student.

§ 147.83 Maintenance of Instructor Requirements.

Each certificated AMT school must, after certification or addition of a rating, continue to provide the number of instructors holding appropriate mechanic certificates and ratings that the President determines necessary to provide adequate instruction to the students, including at least one such instructor for each 25 students in each shop class. The school may continue to provide specialized instructors who are not certificated mechanics to teach mathematics, physics, drawing, basic electricity, basic hydraulics, and similar subjects.

§ 147.85 Maintenance of Facilities, Equipment, and Material.

(a) Each certificated AMT school must provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

(b) A school may not make a substantial change in facilities, equipment, or materials that have been approved for a particular curriculum, unless that change is approved in advance.

§ 147.87 Display of Certificate.

Each holder of an AMT school certificate and ratings must display them at a place in the school that is normally accessible to the public and is not obscured. The certificate must be available for inspection by the President.

§ 147.89 Change of Location.

The holder of an AMT school certificate may not make any change in the school’s location unless the change is approved in advance. If the holder desires to change the location, the President must be notified, in writing, at least 30 working days before the date the change is contemplated. If the

location is changed without approval, the certificate is revoked.

SUBPART G – RECORDKEEPING

§ 147.101 Student Records.

(a) Each certificated AMT school must keep a current record of each student enrolled, must retain the record for at least 2 years after the end of the student's enrollment, and must make each record available for inspection by the President during that period. This record must show for each student—

(1) His attendance, tests, and grades received on the subjects required by this part;

(2) The instruction credited to him under GACAR § 147.81(c), if any; and

(3) The authenticated transcript of his grades from that school.

(b) Each school must keep a current progress chart or individual progress record for each of its students, showing the practical projects or laboratory work completed, or to be completed, by the student in each subject.

§ 147.103 Instructor Records.

Each certificated AMT school must keep a current record of each instructor, must retain the record for at least 2 years after the instructor ceases to perform a function for the AMT school, and must make each record available for inspection by the President during that period.

§ 147.105 Transcripts and Graduation Certificates.

(a) Upon request, each certificated AMT school must provide a transcript of the student's grades to each student who is graduated from that school or who leaves it before being graduated. An official of the school must authenticate the transcript. The transcript must state the curriculum in which the student was enrolled, whether the student satisfactorily completed that curriculum, and the final grades the student received.

(b) Each school must give a graduation certificate or certificate of completion to each student that it graduates. An official of the school must authenticate the certificate. The certificate must show the date of graduation and the approved curriculum title.

§ 147.107 Electronic Recordkeeping.

(a) No certificate holder may use an electronic signature for records requiring a certifying statement unless the electronic signature system is approved by the President.

(b) No certificate holder may use an electronic recordkeeping system for any record required by this part unless the electronic recordkeeping system complies with paragraphs (c) through (e) of this section.

(c) ***Storage and Retrieval***. A computer hardware and software system must have the capability to store and retrieve the records. The system must be capable of producing paper copies of the viewed information at the request of a GACA or SAAIB authorized representative.

(d) ***Security***. Any electronic recordkeeping system must—

(1) Ensure that records are retained for the retention periods prescribed in this part.

(2) Protect confidential information.

(3) Ensure that the information is not altered in an unauthorized way.

(4) Have a corresponding policy and management structure to support the computer hardware and computer software that delivers the information.

(e) ***Procedures***. Before employing an electronic recordkeeping system, a certificate holder must incorporate electronic recordkeeping procedures into its manual to include the following:

(1) Procedures for making required records available to authorized AIB personnel and GACA Inspectors. If the computer hardware and software system is not compatible with the GACA and AIB systems, the certificate holder must provide an employee or representative to assist in accessing the necessary computerized information.

(2) Procedures for reviewing the computerized personal identification codes system to ensure that the system will not permit password duplication.

(3) Procedures for auditing the computer system every 60 days to ensure the integrity of the system. A record of the audit must be completed and retained on file as part of the operator’s record retention requirements. This audit may be a computer program that automatically audits itself.

(4) Audit procedures to ensure the integrity of each computerized workstation unless the workstations are server-based and contain no inherent attributes that enable or disable access.

(5) Procedures describing how the certificate holder will ensure that the electronic records are transmitted in accordance with the appropriate regulatory requirements.

(6) A description of the training procedure and requirements necessary to authorize access to the computer hardware and software system.

(7) For electronic record keeping systems employing digital or electronic signatures, guidelines for authorized representatives of the certificate holder to use electronic signatures and to have access to the appropriate records.

APPENDIX A TO GACAR PART 147 – CURRICULUM REQUIREMENTS

This appendix describes the levels of proficiency at which items under each subject in each curriculum must be taught, as outlined in Appendixes B, C, D, and E to this part.

(a) ***Teaching levels***.

(1) Level 1 requires—

(i) Knowledge of general principles, but no practical application.

(ii) No development of manipulative skill.

(iii) Instruction by lecture, demonstration, and discussion.

(2) Level 2 requires—

(i) Knowledge of general principles, and limited practical application.

(ii) Development of sufficient manipulative skill to perform basic operations.

(iii) Instruction by lecture, demonstration, discussion, and limited practical application.

(3) Level 3 requires—

(i) Knowledge of general principles, and performance of a high degree of practical application.

(ii) Development of sufficient manipulative skills to simulate return to service.

(iii) Instruction by lecture, demonstration, discussion, and a high degree of practical application.

(b) ***Teaching materials and equipment***. The curriculum may be presented using currently accepted educational materials and equipment, including calculators, computers, and audio visual equipment.

APPENDIX B TO GACAR PART 147 – GENERAL CURRICULUM SUBJECTS

This appendix lists the subjects required in at least 400 hours in general curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Table B–I. General Curriculum Subjects

Area of Study	Subject Description General Curriculum	Teaching Level
a. Basic electricity.	*An AMT school may choose to incorporate training on circuits and devices for complex aircraft.These subjects may be incorporated into the six subject areas of this section or be added as separate subjects.*	
	1. Calculate and measure capacitance and inductance.	(2)
	2. Calculate and measure electrical power.	(2)
	3. Measure voltage, current, resistance, and continuity.	(3)
	4. Determine the relationship of voltage, current, and resistance in electrical circuits.	(3)
	5. Read and interpret aircraft electrical circuit diagrams, including solid-state devices and logic functions.	(3)
	6. Inspect and service batteries.	(3)
b.Aircraft drawings.	*An AMT school may reduce the overall complexity of this subject.An AMT school may teach this subject only to the proficiency required to perform normal aircraft inspection and typical repairs and alterations.*	
	7. Use aircraft drawings, symbols, and system schematics.	(2)
	8. Draw sketches of repairs and alterations.	(3)
	9. Use blueprint information.	(3)
	10. Use graphs and charts.	(3)
c. Mass and balance.		

Area of Study	Subject Description General Curriculum	Teaching Level
	11. Weigh aircraft.	(2)
	12. Perform complete mass-and-balance check and record data, emphasizing out-of-center-of-gravity conditions and load calculations.	(3)
	13. Explain mass and balance procedures and requirements, including:jacking, leveling, weighing, installed equipment list, mass and balance report, amendment requirements, and regulatory requirements.	(3)
d. Fluid lines and fittings.	*An AMT school may choose to focus on fabricating rigid lines because most flexible fluid lines are purchased.Students should be instructed in the inspection of flexible lines.*	
	14. Fabricate and install rigid and flexible fluid lines and fittings.	(3)
e. Materials and processes.		
	15. Identify and select appropriate nondestructive testing methods.	(1)
	16. Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	(2)
	17. Familiarize students with basic heat-treating processes.	(1)
	18. Identify and select aircraft hardware and materials.	(3)
	19. Inspect and check welds.Familiarize students with welding and soldering processes through shop visits, demonstrations, and/or classroom instruction.	(3)
	20. Perform precision measurements.	(3)
f. Ground operation and servicing.		
	21. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.With prior approval of the President, an AMT school may use high fidelity simulators to duplicate ground operations in place of actual aircraft.	(2)

Area of Study	Subject Description General Curriculum	Teaching Level
	22. Identify and select fuels from among common types of aircraft fuels in current use.	(2)
g. Cleaning and corrosion control.		
	23. Identify and select cleaning materials and perform aircraft cleaning.	(3)
	24. Inspect for, identify, remove, and treat aircraft corrosion and perform aircraft cleaning.	(3)
h. Mathematics.	*An AMT school may elect to award credit to students in mathematics without teaching it as part of its AMT curriculum. (See GACAR § 147.81(c)(4).)*	
	25. Extract roots and raise numbers to a given power.	(3)
	26. Determine areas and volumes of various geometrical shapes.	(3)
	27. Solve ratio, proportion, and percentage problems.	(3)
	28. Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	(3)
	29. Understand common units of measurement used in aviation maintenance, including the International System of Units.	(3)
	30. Perform calculations, including conversions using:length, velocity, mass, volume, and temperature.	(3)
i. Maintenance forms and records.		
	31. Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	(3)
	32. Complete required maintenance forms, records, and inspection reports.	(3)

Area of Study	Subject Description General Curriculum	Teaching Level
j. Basic physics.	*An AMT school may elect to award credit to students in basic physics without teaching it as part of its AMT curriculum.(See GACAR § 147.81(c)(4)).*	
	33. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	(2)
k. Basic chemistry.		
	34.Understand the principles of the nature of matter; structure of atoms, molecules, crystals, colloids, solutions and solvents; and hardness and ductility.	(2)
l. Maintenance publications.		
	35. Demonstrate ability to read, comprehend, and apply information contained in GACA, FAA and manufacturers' aircraft maintenance specifications, Air Transport Association of America, Inc. (ATA) codes, air carrier background elements, minimum equipment lists (MEL), configuration deviation lists, data sheets, manuals, publications, and related GACAR, airworthiness directives, and guidance material.	(3)
	36. Read technical data.	(3)
m. Mechanic privileges and limitations.	*An AMT school may familiarize students with related regulations to include GACAR Parts 1, 5, 21, 23, 25, 27, 29, 43, 91, 121, 125, 135, and 145.*	
	37. Exercise mechanic privileges within the limitations prescribed by GACAR Part 66.	(3)
n. Human factors/maintenance resource management (MRM).	*Human factors and MRM may be taught as a separate subject and/or incorporated throughout the curriculum.Emphasis should be placed on error management/mitigation and situational awareness.*	

Area of Study	Subject Description General Curriculum	Teaching Level
	38. Conduct a short computer-assisted instruction course in basic MRM principles followed by integrated applications.	(1)
o. Aircraft electrical introduction.		
	39. Teach basic concepts of aircraft electronics, including digital electronics and operational principles.	(1)
p. Fire protection systems.	*An AMT school may teach this subject in the general curriculum, instead of separately in the airframe and powerplant curriculums, to avoid teaching the subjects twice.This may be accomplished only by a school teaching a combined airframe and powerplant curriculum.*	
	40. Identify the different classes of fires and suitable extinguishers.	(2)
	41. Inspect, check, and service smoke and carbon monoxide detection systems.	(1)
	42. Describe the various types of aircraft fire detection systems, including spot detectors, continuous loop, infrared, and ultraviolet.	(2)
	43. Describe the various types of suppression and extinguishing systems and safety precautions, including aircraft installed and portable.	(2)
	44. Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	(3)
q. General aircraft inspection principles.		

Area of Study	Subject Description General Curriculum	Teaching Level
	45. Perform a capstone inspection module.This module must include research into regulations, maintenance manuals, and other relevant documentation encountered during a normal inspection.Students must become familiarized with application of type certificate data sheets, illustrated parts catalogs, structural repair manuals, airworthiness directives, and similar documentation.Additional focus must be placed on human factors principles, such as norms, shift turnovers, situational awareness, and inspection integrity.Students must also receive initial training in principles of visual inspection, including defect recognition, detection, and classification.	(2)
r. Maintenance Procedures.		
	46. Explain the inspection and maintenance requirements for private and commercial aircraft as outlined in the GACAR.	(3)
	47. Explain the fundamentals and types of aircraft inspections, including:periodic, annual, and approved maintenance schedules; abnormal occurrence (hard landing, lightning strike); and special (airworthiness directive or service bulletin).	(3)
	48. Explain differences between fixed and rotary wing aircraft mass and balance procedures, including lateral center of gravity.	(3)
	49. Explain the fundamentals of quality assurance.	(3)
	50. Perform a mass and balance procedure on an aircraft, including associated documentation.	(3)
	51. Perform a completion of documentation of maintenance records, including:technical records, defect lists, technical reports, and service difficulty reporting.	(3)
	52. Perform a computerized information input and retrieval.	(3)
	53. Perform tasks using MELs, Configuration Deviation Lists, and built-in test equipment (BTE) programs.	(3)

Area of Study	Subject Description General Curriculum	Teaching Level
s. General		
	54. Explain human factors in maintenance operations.	(3)
	55. Perform tasks using health and safety practices, including handling of chemicals, metals, pyrotechnics, and dangerous goods.	(3)
	56. Perform tasks extracting information from technical publications, including the ATA system.	(3)
t. Hand tools and precision instruments.		
	57. Perform tasks using the proper selection and use of hand and power tools.	(3)
u. Metallurgy.		
	58. Identify types of corrosion.	(2)
	59. Explain the methods of corrosion treatment and prevention.	(2)
	60. Perform tasks identifying the types, properties, and coding of aircraft metals.	(3)
	61. Perform relevant manufacturing treatment processes of aircraft metals.	(3)
v. Aircraft servicing.		
	71. Explain servicing of aircraft systems such as water, waste, and oxygen.	(2)
	72. Explain the classifications, functions, principles, and properties of lubricants including engine oil, grease, and hydraulic fluids.	(2)
	73. Explain aircraft deicing procedures.	(2)
	74. Explain operating procedures and safety precautions of ground support equipment required to service the aircraft.	(2)

Area of Study	Subject Description General Curriculum	Teaching Level
	75. Explain aircraft grooming procedures and precautions.	(2)
	76. Perform a fuel contamination check.	(3)
	77. Perform tire servicing and inflation.	(3)
	78. Perform servicing of aircraft main batteries.	(3)
	79. Perform servicing of lubrication, fuel, oil, and hydraulic systems.	(3)
	80. Perform standard ground handling practices.	(3)
	81. Perform jacking of an aircraft.	(3)
w. Approved parts.		
	82. Identify aircraft hardware using relevant parts systems.	(2)
	83. Explain the application of metric and English unified systems to aircraft hardware.	(2)
	84. Explain the needs and rationale for aircraft specifications.	(2)
	85. Explain inventory control including traceability, quarantine, requisitioning, and bonded stores.	(2)
	86. Perform an installation and securing of standard hardware and connectors.	(3)

APPENDIX C TO GACAR PART 147 – AIRFRAME CURRICULUM SUBJECTS

This appendix lists the subjects required in at least 750 hours of each airframe curriculum, in addition to at least 400 hours in general curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Table C–I. Airframe Structures

Area of Study	Subject Description Airframe Structures	Teaching Level
a. Wood structures.		
	1. Service and repair wood structures.	(1)
	2. Identify wood defects.	(1)
	3. Inspect wood structures.	(1)
b. Aircraft covering.		
	4. Select and apply fabric and fiberglass covering materials.	(1)
	5. Inspect, test, and repair fabric and fiberglass.	(1)
c. Aircraft finishes.		
	6. Apply trim, letters, and touchup paint.	(1)
	7. Identify and select aircraft finishing materials.	(2)
	8. Apply finishing materials. An AMT school may primarily focus on application of corrosion prevention materials.	(2)
	9. Inspect finishes and identify defects.	(2)
d. Sheet metal and non-metallic structures.		
	10. Select, install, and remove special fasteners for metallic, bonded, and composite structures.	(2)
	11. Inspect bonded structures.	(2)

Area of Study	Subject Description Airframe Structures	Teaching Level
	12. Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures, focusing on the detection and inspection of defects and the repair of damage, using manufacturer's structural repair manual guidelines.	(2)
	13. Inspect, check, service, and repair windows, doors, and interior furnishings.	(2)
	14. Reserved.	-
	15.Explain the difference between a structural and nonstructural repair.	(2)
	16.Explain the application, installation, and removal of special fasteners.	(2)
	17.Explain the requirements for scratch inspection.	(2)
	18.Explain the purpose and use of sealant.	(2)
	19. Reserved.	-
	20. Form, lay out, and bend sheet metal.	(3)
	21.Perform the installation, inspection, and removal of solid rivets.	(3)
	22.Perform the installation and removal of standard fasteners.	(3)
	23.Perform sheet metal repair and modifications including cutting, bending, forming, and fabricating.	(3)
e. Welding.		
	24 Weld magnesium and titanium.	(1)
	25. Solder stainless steel.	(1)
	26. Fabricate tubular structures.	(1)
	27. Solder, braze, gas-weld, and arc-weld steel. An AMT school may elevate soldering as a separate subject to teaching level 3.	(2)
	28. Weld aluminum and stainless steel.	(1)

Area of Study	Subject Description Airframe Structures	Teaching Level
f. Assembly and rigging.		
	29. Rig rotary-wing aircraft.	(1)
	30. Rig fixed-wing aircraft.	(2)
	31. Check alignment of structures.	(2)
	32. Assemble aircraft components, including flight control surfaces.	(3)
	33. Balance, rig, and inspect movable primary and secondary flight control surfaces.	(3)
	34. Jack aircraft.	(3)
g. Airframe inspection.		
	35. Perform airframe conformity and airworthiness inspections.	(3)
h. Aircraft structures.		
	36. Identify structural members and stress involved in floats, hulls, skis, stabilizers, wings, engine mounts, cowlings, and fuselages.	(3)
	37. Identify types of primary aircraft structures.	(3)

Table C–II. Airframe Systems and Components

Area of Study	Subject Description Airframe Systems and Components	Teaching Level
a. Aircraft landing gear systems.		
	38. Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.	(3)

Area of Study	Subject Description Airframe Systems and Components	Teaching Level
b. Hydraulic and pneumatic power systems.		
	39. Repair hydraulic and pneumatic power systems components.	(2)
	40. Identify and select hydraulic fluids.	(3)
	41. Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.	(3)
c. Cabin atmosphere control systems.		
	42. Inspect, check, troubleshoot, service, and repair air cycle machines.	(1)
	43. Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.	(1)
	44. Inspect, check, troubleshoot, service and repair oxygen systems.	(2)
d. Aircraft instrument systems.		
	45. Inspect, check, service, troubleshoot, and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of BTE. An AMT school that teaches a combined airframe and powerplant curriculum may elect to combine this subject with the instruction of powerplant instrument systems.	(1)
	46. Install instruments and perform a static pressure system leak test.	(2)
e. Communication and navigation systems.		

Area of Study	Subject Description Airframe Systems and Components	Teaching Level
	47. Inspect, check, and troubleshoot autopilot, servos, and approach coupling systems.	(1)
	48. Inspect, check, and service aircraft electronic communication and navigation systems, including very high frequency (VHF) passenger address interphones and static discharge devices, aircraft VHF Omnirange Station (VOR), Instrument Landing System (ILS), Global Positioning System (GPS), Radar beacon transponders, flight management computers, Terrain Awareness and Warning System (TAWS), and integrated autoflight systems.	(1)
	49. Inspect and repair antenna and electronic equipment installations.	(2)
f. Aircraft fuel systems.	*An AMT school may combine appropriate elements of this material with elements of the engine fuel system instruction located in the powerplant curriculum.*	
	50. Check and service fuel dump systems.	(1)
	51. Perform fuel management transfer and defueling.	(1)
	52. Inspect, check, and repair pressure fueling systems.	(1)
	53. Repair aircraft fuel system components.	(2)
	54. Inspect and repair fluid quantity indicating systems.	(2)
	55. Troubleshoot, service, and repair fluid pressure and temperature warning systems.	(2)
	56. Inspect, check, service, troubleshoot, and repair aircraft fuel systems.	(3)
g. Aircraft electrical systems.	*An AMT school may elect to combine aircraft electrical system subjects with the basic electricity subject in the general curriculum.*	
	57. Repair and inspect aircraft electrical system components, crimp and splice wiring to manufacturers' specifications, and repair pins and sockets of aircraft connectors.	(2)
	58. Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.	(3)

Area of Study	Subject Description Airframe Systems and Components	Teaching Level
	59. Inspect, check, troubleshoot, service, and repair AC and DC electrical systems.	(3)
	60. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.	(1)
h. Position and warning systems.		
	61. Inspect, check, and service speed and configuration warning systems, electrical brake controls, and anti-skid systems.	(2)
	62. Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.	(3)
i. Ice and rain control systems.		
	63. Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	(2)
j. Fire protection systems.	*An AMT school may teach this subject in the general curriculum to avoid teaching these subjects twice.This may only be accomplished by a school teaching a combined airframe and powerplant curriculum.*	
	64. Inspect, check, and service smoke and carbon monoxide detection systems.	(1)
	65. Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	(3)
k. Airframe inspection.		
	66.Perform a capstone inspection module.This module should include research on regulations, maintenance manuals, and other relevant documentation encountered during a normal airframe inspection.	(2)

APPENDIX D TO GACAR PART 147 – POWERPLANT CURRICULUM SUBJECTS

This appendix lists the subjects required in at least 750 hours of each powerplant curriculum, in addition to at least 400 hours in general curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Table D–I. Powerplant Theory and Maintenance

Area of Study	Subject Description Powerplant Theory and Maintenance	Teaching level
a.Reciprocating engines.		
	1. Inspect and repair a radial engine.	(1)
	2. Overhaul reciprocating engine.	(2)
	3. Inspect, check, service, and repair reciprocating engines and engine installations.	(3)
	4. Install, troubleshoot, and remove reciprocating engines.	(3)
	5.Explain the basic design and theory of operation.	
	6.Explain the calculation of energy, work, and horsepower.	
	7.Explain piston engine classification terminology.	
	8.Explain the principles of operation and identify the components of reciprocating engine ignition systems.	
b. Turbine engines.	*Curriculum should focus on modular engines, breakdowns, disassembly, reassembly, and understanding of basic principles*	
	9. Overhaul turbine engine.	(2)
	10. Inspect, check, service, and repair turbine engines and turbine engine installations, focusing on common in-service issues such as hot-section service and repair.	(3)
	11. Install, troubleshoot, and remove turbine engines.	(3)

	12.Explain the development, fundamentals, and principles of operation of turbine engines.	(3)
	13.Explain engine design and construction pertaining to inlet ducts, compressors, bleed valves, diffusers, vane controllers, combustion section, turbines, exhaust section, gearboxes, bearings and seals, and engine mounts.	(3)
	14.Explain the factors affecting thrust and torque.	(3)
	15.Explain the purpose and advantages of modular construction.	(3)
	16.Explain the common designs of turbine engines, including —torque-producing engines (turboshaft and turboprop) and thrust-producing engines (turbojet and turbofan).	(3)
	17.Explain the principles of noise suppression techniques.	(3)
	18.Explain turbine engine systems including fuel, lubrication, ignition, and air exhaust.	(3)
	19.Describe common turbine engines terminology and acronyms.	(2)
c.Engine inspection.		
	20. Perform powerplant conformity and airworthiness inspections.	(3)

Table D–II. Powerplant Systems and Components

Area of Study	**Subject Description** **Powerplant Systems and Components**	**Teaching level**
a. Engine instrument systems.		
	21. Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	(2)
	22. Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and revolutions per minute (RPM) indicating systems.	(3)

b. Engine fire protection systems.		
	23. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.	(3)
c. Engine electrical systems.		
	24. Repair engine electrical system components.	(2)
	25. Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.	(3)
d. Lubrication systems.		
	26. Identify and select lubricants.	(2)
	27. Repair engine lubrication system components.	(2)
	28. Inspect, check, service, troubleshoot, and repair engine lubrication systems.	(3)
e. Ignition and starting systems.		
	29. Overhaul magneto and ignition harness.	(2)
	30. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	(2)
	31. Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.	(3)
	32. Inspect, service, and troubleshoot turbine engine pneumatic starting systems.	(1)
f. Fuel metering systems.		
	33. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.	(1)

	34. Overhaul carburetor.	(2)
	35. Repair engine fuel metering system components.	(2)
	36. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.	(3)
g. Engine fuel systems.		
	37. Repair engine fuel system components.	(2)
	38. Inspect, check, service, troubleshoot, and repair engine fuel systems.	(3)
h. Induction and engine airflow systems.		
	39. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.	(2)
	40. Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.	(1)
	41. Inspect, check, service, and repair carburetor air intake and induction manifolds.	(3)
i. Engine cooling systems.		
	42. Repair engine cooling system components.	(2)
	43. Inspect, check, troubleshoot, service, and repair engine cooling systems.	(3)
j. Engine exhaust and reverser systems.		
	44. Repair engine exhaust system components.	(2)

	45. Inspect, check, troubleshoot, service, and repair engine exhaust systems.	(3)
	46. Troubleshoot and repair engine thrust reverser systems and related components.	(1)
k. Propellers.		
	47. Inspect, check, service, and repair propeller synchronizing and ice control systems.	(1)
	48. Identify and select propeller lubricants.	(2)
	49. Balance propellers.	(1)
	50. Repair propeller control system components.	(2)
	51. Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems.	(3)
	52. Install, troubleshoot, and remove propellers.	(3)
	53. Repair aluminum alloy propeller blades.	(3)
	54.Explain the theory and design of aircraft propellers, including —forces acting on a propeller, lift and angle of attack, and propeller construction materials.	(3)
	55.Explain fixed pitch, controllable pitch, constant speed, feathering, and reversing propellers.	(3)
l. Unducted fans.		
	56. Inspect and troubleshoot unducted fan systems and components.	(1)
m. Auxiliary power units.		
	57. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.	(1)
n. Powerplant inspection.		

o. Engine indicating systems.		
	59.Explain the principles and operation of engine indicating systems, including—speed indication, temperature indication, pressure indication, flow metering systems, quantity indication (oil quantity), fault detection (chip detector, filter bypass), power indication systems engine pressure ratio (EPR), torque indication, status annunciators, BTE system, and vibration indication.	(3)
p. Turbine engine safety.		
	60.Explain the safety precautions and hazards while ground running, including—foreign object ingestion, jet/prop blast, turbine burst, personnel, noise, hazards created by deviation from procedures (integrated systems), and aircraft restraints (chocks, tie downs).	(3)
q. Ignition.		
	61.Explain the types of operation of turbine engine ignition systems and their components, including—:low tension (glow plugs), high tension (capacitive discharge), and auto relight.	(3)
	62.Explain turbine engine ignition system safety precautions.	(3)
r. Starting.		
	63.Explain the design and components of starting systems.	(3)
	64.Explain the operation of various turbine engine starters including air turbine starters and electrical starters (motor and starter-generator).	(3)
	65.Explain the inspection and servicing procedures for starting systems.	(3)
	66.Explain the operation of an auto-start system.	(3)

58.Perform a capstone inspection module.This module must include research into regulations, maintenance manuals, and other relevant documentation encountered during a normal powerplant inspection.The module must also include evaluation of powerplant performance in a test cell.	(2)

APPENDIX E TO GACAR PART 147 – AVIONICS CURRICULUM SUBJECTS

This appendix lists the subjects required in at least 750 hours of each avionics curriculum, in addition to at least 400 hours in general curriculum subjects.

The number in parentheses after each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Area of Study	Subject Description Avionics	Teaching level
a. Engine indicating systems.		
	1. Explain the principles and operation of engine indicating systems, including—speed indication, temperature indication, pressure indication, flow metering systems, quantity indication (oil quantity), fault detection (chip detector, filter bypass), power indication systems EPR, torque indication, status annunciators, BTE system, and vibration indication.	(3)
b. Analog theory.		
	2. Explain semiconductor devices.	(2)
	3. Explain semiconductor theory.	(2)
	4. Explain diodes.	(2)
	5. Explain transistors.	(2)
	6. Explain power supplies.	(2)
	7. Explain rectification.	(2)
	8. Explain filtering.	(2)
	9. Explain regulation.	(2)
	10. Explain controls.	(2)

Area of Study	Subject Description Avionics	Teaching level
c. Digital theory principles.		
	11. Explain integrated circuits (large-scale integration (LSI), Complementary Metal Oxide Semiconductor (CMOS)).	(2)
	12. Explain special application integrated circuits.	(2)
	13. Explain pulse techniques.	(2)
	14. Explain pulse parameters.	(2)
	15. Explain pulse modulation (Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), RPM, Pulse Code Modulation (PCM)).	(2)
	16. Explain multivibrators (monostable, astable, bi-stable).	(2)
	17. Explain Boolean algebra.	(1)
	18. Explain basic laws and expressions.	(2)
	19. Explain numbering systems.	(2)
	20. Explain decimals.	(2)
	21. Explain binary.	(2)
	22. Explain hexadecimal.	(2)
	23. Explain octal.	(2)
	24. Explain conversions.	(2)
	25. Explain binary computations.	(2)
	26. Explain digital electronics techniques.	(2)
	27. Explain logic gates (AND, OR, Invert, NAND, NOR, COMP).	(2)
	28. Explain the application of logic gates (Decoder, Analog to Digital (AD)/Digital to Analog (DA), Multiplexing).	(2)
	29. Explain the application of basic digital/microcomputer technology.	(2)
	30. Explain microprocessors and data transfer between systems.	(2)

Area of Study	Subject Description Avionics	Teaching level
	31. Explain summing amplifiers (operational amplifiers).	(2)
	32. Explain differentiators.	(2)
	33. Explain integrators.	(2)
	34. Explain servo loops.	(2)
	35. Explain the application of control systems, including powerplant, flight control, and landing gear.	(3)
	36. Explain integrated circuits (LSI, CMOS).	(2)
	37. Explain special application integrated circuits.	(2)
	38. Perform binary computations and conversions.	(3)
d. Maintain communication systems.		
	39. Identify ELTs.	(3)
	40. Identify radio antennas.	(3)
	41. Identify high frequency communications.	(3)
	42. Identify VHF communications.	(3)
	43. Identify selective-calling (SELCAL) radio systems.	(3)
	44. Describe acceptable standards.	(3)
	45. Explain radio theory.	(3)
	46. Explain amplifiers.	(3)
	47. Explain oscillators.	(3)
	48. Explain filters.	(3)
	49. Explain mixers.	(3)
	50. Explain modulation.	(3)
	51. Explain radio antennas.	(3)
	52. Explain radio transmitters and receivers.	(3)
	53. Explain troubleshooting techniques.	(3)

Area of Study	Subject Description Avionics	Teaching level
	54. Explain remote radio channeling.	(3)
	55. Explain digital communications.	(3)
	56. Explain high frequency communications.	(3)
	57. Explain VHF communications.	(3)
	58. Explain SELCAL.	(3)
	59. Explain interphone, including flight, service, and audio integration.	(3)
	60. Explain passenger entertainment (multiplex audio and video).	(3)
	61. Explain air and ground radio telephone.	(3)
	62. Explain ELT-satellite communications.	(3)
	63. Explain aircraft systems troubleshooting, including—ramp testing and troubleshooting communications equipment; and locating and repairing predetermined faults.	(3)
	64. Perform an installation of avionics systems, including —equipment tray, wire installation, antenna installation, and line replaceable unit.	(3)
	65. Perform an electrical load analysis.	(3)
	66. Perform a mass and balance amendment.	(3)
	67. Perform an approval for return to service documentation.	(3)
	68. Perform technical records entries.	(3)
	69. Perform a functional check of high frequency and VHF communications systems.	(3)
	70. Test, troubleshoot, repair, adjust, remove, and replace an ELT.	(3)
	71. Test, troubleshoot, repair, adjust, remove, and replace radio antennas.	(3)
	72. Test, troubleshoot, repair, adjust, remove, and replace high frequency communications.	(3)

Area of Study	Subject Description Avionics	Teaching level
	73. Test, troubleshoot, repair, adjust, remove, and replace VHF communications.	(3)
e. Maintain navigation systems.		
	74. Describe acceptable standards.	(3)
	75. Explain navigation principles.	(3)
	76. Explain navigation antennas.	(3)
	77. Explain standard practices.	(3)
	78. Explain flight management systems.	(3)
	79. Explain inertial navigation systems.	(2)
	80. Explain inertial reference.	(2)
	81. Explain radio navigation, including—Automatic Direction Finder (ADF), VOR, localizer, glideslope, marker beacon, horizontal situation indicator, and area nav.	(3)
	82. Explain long range navigation (LORAN).	(3)
	83. Explain hyperbolic navigation principles.	(3)
	84. Explain GPSs.	(3)
	85. Explain aircraft system troubleshooting, including—ramp testing and troubleshooting navigation equipment; and locating and repairing predetermined faults.	(3)
	86. Test, troubleshoot, repair, adjust, remove, and replace each of the following systems, including its associated antennas:ADF, VOR, localizer, glideslope, marker beacon, horizontal situation indicator, and area nav.	(3)
	87. Perform an avionics system equipment tray installation.	(3)
	88. Perform a wire installation.	(3)
	89. Perform an antenna installation.	(3)

Area of Study	Subject Description Avionics	Teaching level
	90. Perform an installation of a line replaceable unit.	(3)
	91. Perform an electrical load analysis.	(3)
	92. Perform a mass and balance amendment.	(3)
	93. Perform an approval for return to service documentation.	(3)
	94. Perform technical records entries.	(3)
f. Maintain pulse systems.		(3)
	95. Explain radar navigation systems, including—introduction to microwave principles and pulse techniques, weather radar, throttle control assembly (TCA), radio altimeter, Distance Measuring Equipment (DME) interrogator, Air Traffic Control (ATC) transponder, Doppler principles, and TAWS/Ground Proximity Warning System (GPWS).	(3)
	96. Explain troubleshooting aircraft systems, including—ramp test and troubleshoot pulse systems, and locate and repair predetermined faults.	(3)
	97. Explain avionics system installation, including—equipment tray installation, wire installation, antenna installation, and line replaceable units.	(3)
	98. Test, troubleshoot, repair, adjust, remove, and replace radar navigation systems, including—weather radar, DME interrogator, ATC transponder, and radio altimeter.	(3)
g. Maintain auto flight control systems.		
	99. Explain a system overview of yaw damper systems, flight directors, autopilot, speed commands, auto throttle, standard practices, Vertical Navigation (VNAV), and stability augmentation systems.	(2)

Area of Study	Subject Description Avionics	Teaching level
	100. Explain aircraft systems troubleshooting, including—ramp testing and troubleshooting of auto flight equipment; and locating and repairing faults.	(2)
h. Maintain electrical systems.		
	101. Explain the proper use of test equipment to support curriculum.	(3)
	102. Explain wiring practices, including wire and co-axial cable specifications.	(3)
	103. Explain drawing and schematic symbology.	(3)
	104. Explain bonding electromagnetic interference (EMI) and radio frequency interference (RFI) suppression techniques.	(3)
	105. Perform wire stripping.	(3)
	106. Perform soldering and de-soldering.	(3)
	107. Perform various crimping methods.	(3)
	108. Perform various splicing techniques.	(3)
	109. Perform looming procedures.	(3)
	110. Perform plugs, receptacles, and connectors procedures.	(3)
	111. Perform physical protection devices techniques.	(3)
	112. Perform potting techniques.	(3)
	113. Perform high reliability techniques.	(3)
	114. Perform routing, lacing, and clamping techniques.	(3)
	115. Perform wire identification.	(3)
	116. Perform wire selection.	(3)
	117. Perform electrical load analysis.	(3)
	118. Perform mass and balance amendment.	(3)
	119. Perform an approval for return to service documentation.	(3)
	120. Perform technical records entries.	(3)

Area of Study	Subject Description Avionics	Teaching level
	121. Perform controls (voltage regulators and protection devices).	(3)
	122. Troubleshoot aircraft systems, including ramp test and troubleshoot electrical systems.	(3)
	123. Troubleshoot aircraft systems, including locate and repair predetermined faults.	(3)
	124. Troubleshoot aircraft systems, including service batteries.	(3)
	125. Troubleshoot aircraft systems and testing of DC generation, including controls (voltage regulators and protection devices) and inverters.	(3)
	126. Troubleshoot aircraft systems, including labeling, testing, troubleshooting, and repair of—AC generation, including alternators and DC generators; and installation of—electrical system wires, components, and batteries.	(3)
	127. Describe electrical system installation, including acceptable standards.	(3)
	128. Describe electrical power systems monitoring devices.	(3)
i. Maintain instrument systems.		
	129. Describe acceptable standards.	(3)
	130. Explain air data systems and implementations, including—pitot and static system check, central air data computing system, air data instruments (mach/indicated airspeed (IAS), vertical speed indicator (VSI)/instantaneous VSI (IVSI), barometric altimeter (BARO ALTM), air temperature instruments, and mach-airspeed warning.	(3)

Area of Study	Subject Description Avionics	Teaching level
	131. Explain altitude and direction, including—introduction to gyroscopic and flux valve principles, gyrosyn compass system/magnetic compass, attitude reference systems, turn and bank/turn coordinator/slip indication, standby artificial horizon, laser gyro, attitude director indicators, video displays, and Electronic Flight Instrument System (EFIS).	(3)
	132. Explain flight data and voice recorder, including—system requirement, system operation and testing, and underwater acoustic beacon operation and testing.	(3)
	133. Explain compass swing.	(3)
	134. Explain data bus systems.	(3)
	135. Explain the installation of instrument systems, including —equipment installation and wire installation.	(3)
	136. Perform electrical load analysis (if applicable).	(3)
	137. Perform mass and balance amendment.	(3)
	138. Perform approval for return to service documentation.	(3)
	139. Perform journey and technical log entries.	(3)
	140. Perform compass swing.	(3)
	141. Perform installation of instrument system, including equipment and wire installation.	(3)
	142. Test, troubleshoot, repair, adjust, remove, and replace ramp test and troubleshoot instrument systems.	(3)
	143. Test, troubleshoot, repair, adjust, remove, and replace in relation to location and repair of predetermined faults.	(3)
	144. Test, troubleshoot, repair, adjust, remove and replace air data systems and instrumentation, including—pitot and static system and check; central air data computing system; air data instruments (mach/IAS, VSI/IVSI, BARO ALTM), and gyrosyn compass system/magnetic compass.	(3)