s407 - Personnel Licensing Standards Respecting Aircraft Maintenance Technician Licensing

s407.05 Issue, Endorsement and Renewal of an Aircraft Maintenance Technician Licence - Requirements

1. An applicant shall complete form LAR 407/01 and submit it to the Authority along with the required supporting documentation and the prescribed licence fee.

2. Proof of Citizenship - The following documents are acceptable as proof of citizenship:
   a) a Lebanese Identity Card;
   b) a valid passport; or
   c) an aviation personnel licence showing the citizenship of the holder and issued by the state of which the applicant is a citizen, plus a second legal document satisfactory to the Authority.

3. Age
   a) An applicant shall be a minimum of 19 years of age.
   b) The following documents are acceptable proof of the age of an applicant for a personnel licence or rating:
      i) a Lebanese Identity Card;
      ii) a valid passport; or
      iii) an aviation personnel licence showing the citizenship of the holder and issued by the state of which the applicant is a citizen, plus a second legal document satisfactory to the Authority.

4. Knowledge
   a) For initial issue of a licence, an applicant shall present documentary evidence of having successfully completed an approved course of training and where the technical knowledge exams are approved as part of the training program, passed the Air Law and Airworthiness Requirements exam specified by the Authority.
   b) Where the applicant has not completed a training program which includes approved technical knowledge exams, shall have passed exams specified by the authority in:
      i) Air law and airworthiness requirements,
      ii) Natural science and aircraft general knowledge,
      iii) Aircraft engineering,
      iv) Aircraft maintenance, and
      v) Human performance and limitations.
   c) When completion of an approved training course is a prerequisite for issue of a rating or an additional class or sub-class, the applicant shall present documentary evidence of successful completion of the required course.

5. Experience
   a) Applicants shall have acquired the amount and type of total, class, and civil aviation maintenance experience specified in Table s407.05 - 1. This table must be applied together with the general requirements specified in this standard.
   b) To use the table, first refer to the licence class, then read across horizontally, to identify training, applicable experience, and examination requirements.

c) Experience requirements are given in months. Each column specifies a different type of experience, and the applicant will be assessed separately against each category (i.e. the same time period may be applied to more than one column).

d) When assessing experience claims, one year shall consist of a minimum of 1800 working hours. Maintenance of ultra-light or amateur built aircraft, does not qualify for any experience credit.

e) Experience credit shall be granted for approved basic training in the ratio of one month's credit for each 100 hours of training.

f) In the columns of the following table, the following descriptions of "Aviation Maintenance Experience" apply:

i) "***Total***" means experience in the maintenance of complete aircraft, electronic (avionics) systems or structures;

ii) "***Class***" means experience in the maintenance of aeronautical products of the kind defined in the scope of privileges for the rating;

iii) "***Civil***" means experience in the maintenance of civil registered aircraft, or parts thereof, and relates only to maintenance that is subject to a maintenance release pursuant to LAR 575, or an equivalent certification under the rules of a contracting state.

g) As proof of experience, the applicant shall submit a personal log book or equivalent document, signed by the person responsible for the maintenance release of the work recorded. At the time of application, the candidate must have acquired all but six months of the required total experience. The required amount of total experience may be reduced by the amount of credit associated with an approved basic training course, up to a maximum of 12 months:

Licence *Class*	Scope of Privileges	Approved Basic Training	Aviation Maintenance Experience			Exams Required
			Total	Class	Civil	
M1	Small aircraft of the sub-class endorsed	Basic Aircraft Maintenance course	36	12	6	Yes
M2	Large aircraft of the type endorsed	Basic Aircraft Maintenance course	36	12	6	Yes
E	Electronics of the system type endorsed	Basic Aircraft Electronics course	36	12	6	Yes
S	Structures of the type endorsed	Basic Aircraft Structures course	36	24	6	Yes

Notes: 1. For ease of reference, the M1 and M2 ratings have been identified as small and large aircraft. The actual definition for all ratings is specified in s407.08.

2. Maintenance of ultra-light, advanced ultra-light, or amateur-built aircraft does not qualify for the experience credit.

6. Skill

a) Applicants shall have performed a representative selection of eligible maintenance tasks, over the full range of systems or structures. The tasks shall comprise not less than 60 percent of the items listed in Appendix F applicable to the class/rating for which the application is made. Each task claimed shall have been subject to a maintenance release pursuant to LAR 575, or an equivalent certification under the rules of a contracting state.

Note: The requirement for a maintenance release is to ensure the tasks are completed on aircraft in operational service, not in a training simulation.

b) Proof of having completed aircraft maintenance tasks shall take the form of a certification by the AMT, or equivalent person who supervised the work. The certification statement shall include the date and the aircraft type, registration mark, or component serial number, as applicable, and confirm that the applicant is able to:

i) identify the correct standard;

ii) select the proper tools;

iii) perform the task correctly without supervision; and

iv) complete the necessary documentation.

c) Persons who sign for completion of maintenance tasks shall be responsible for the accuracy of statements made.

Note: One means of demonstrating compliance with the experience and skill requirements is the use of an Aircraft Maintenance Technician Logbook. Work schedules or task sheets that contain the required information may also be an acceptable method of demonstrating compliance.

Note: For additional classes or ratings the applicant must supply documentary evidence of meeting the knowledge and experience as specified in s407.08.

7. An AMT Licence shall will be renewed when the applicant supplies documentary evidence that establishes that the applicant has:

a) for at least six months within the preceding 24 months,

i) performed aircraft maintenance,

ii) supervised the performance of aircraft maintenance,

iii) supervised in an executive capacity the performance of aircraft maintenance, or

iv) served as an aviation maintenance instructor or supervised another aviation maintenance instructor in an aircraft maintenance training course provided by an approved training organization: and

b) paid the required fee.

8. Where an AMT licence has been expired for:

a) two years or less, it shall be renewed when the applicant supplies documentary evidence that establishes that the applicant meets the renewal requirement specified in sub-section 7 including a letter from the supervising AMT certifying that the applicant is competent to exercise the privileges of the licence.

b) more than two years, it will be renewed when the applicant meets the requirements for initial issue.

Note: In the case of licences that have been expired for more than two years the Authority shall make an assessment of the applicants experience and work history and may assign credits toward the renewal requirements.

9. Foreign Credits - The Authority shall review the training, experience and work history of each applicant and the licensing requirements of the state of issue of the licence, on an individual basis. Credits toward the issue of a Lebanese Maintenance Technician licence will be assigned on the basis of this review.

s407.07 Recency Requirements

The holder of an AMT licence who has not met the recency requirement of 407.07(1) may regain currency by completing six months experience in the performance of maintenance of a class for which the licence was issued and endorsed, and having his logbook endorsed by the supervising AMT certifying that the licence holder is competent to exercise the privileges of the licence.

s407.08 Licence Class and Ratings

1. An AMT licence will be issued in one or more of the following classes:

Class	Maintenance Release Privileges
M1	All aircraft (other than turbojet aircraft) certificated to FAR/JAR 22, 23, 27 and equivalent other standards, and all piston-powered aircraft with a MTOW of 5700 kg. or less, including their engines, propellers, components, systems and minor repairs and modifications to structures in the sub-class which is endorsed on the licence.
M2	All aircraft not included in the M1 rating, including their engines, propellers, components, systems and minor repairs and modifications to structures, which are individually endorsed on the licence. Where an M2 licence is issued with no type rating, the holder shall be limited to privileges authorized through the AMO in which the holder is employed.
E	All aircraft electrical, instrument, radio and autoflight systems, including non-specialized structural work associated with the maintenance of those systems of the system type which is endorsed on the licence.
S	All airframe structures utilizing materials of the type endorsed on the licence.

2. M1 Sub-class Ratings.
   a) A M1 licence will be issued with ratings in one or more of the following sub-classes:
      i) Fixed wing category aircraft,
      ii) Rotary wing category aircraft,
      iii) Piston engine aircraft, or
      iv) Turbine powered aircraft.
   b) An applicant shall present documentary evidence of completion of a minimum of six month practical experience in maintenance of aircraft of the at sub-class.

3. M2 Individual Aircraft Type Ratings.
   a) An applicant shall have successfully completed an approved type rating course.
   b) Where an ATO engages in the delivery of bridging programs to address rating differences, the program must meet all applicable rating requirements identified in this Sub-part.

4. E - System Type Ratings.
   a) Ratings will be issued for the following types of systems:
      i) Instrument and Electrical,
      ii) Radios, or
      iii) Autoflight.
   b) An applicant shall present documentary evidence of completion of a minimum of six month practical experience in maintenance of the type of systems.

5. S - Type Rating.

a) Ratings will be issued for the following construction material types:

i) Wood,

ii) Tubular

iii) Sheet Metal ,or

iv) Composite.

b) An applicant shall have successfully completed:

i) an approved basic structures course,

ii) an approved course on the type of construction to be endorsed on the licence, and

iii) provide documentary evidence of at least six months practical experience in maintenance of this type of construction.

s407.10 Training Organization Approvals

1. Application for an Approved Training Organization Certificate shall be made in writing to the Authority, and accompanied by two copies of a Training Organization Manual (TOM) and training outline (in hard copy or electronic form) that meets the following requirements.

2. The Training Organization Manual (TOM) may be a stand-alone document, or be contained in another manual, such as an air operator Maintenance Control Manual. The document shall be in sufficient detail and structured in such a manner as to form an easily accessible reference standard for day to day use and regulatory audit. The manual shall include the following elements:

a) <u>An Organizational Chart:</u>

The organizational chart shall show the responsibilities and reporting level of each faculty member. Where an individual reports to more than one manager, the chart shall make clear which manager is responsible for which function. The TOM shall describe the duties, position qualifications and responsibilities of each of the reporting levels listed on the organizational chart and describe the duties and responsibilities of the advisory committee.

b) <u>A Policy Manual Amendment System:</u>

The amendment system shall include a description of the TOM amendment procedure to ensure that the TOM in use reflects the latest approved amendment. It must include a means of identifying each page of the TOM. This may be in the form of a List of Effective Pages, with each page numbered and either dated or marked with a revision number.

c) <u>Course Instructors:</u>

An appropriate number of instructors, licensed in aircraft maintenance or having experience in the applicable specialty. Instructors must be trained in instructional techniques and in the applicable subject matter.

d) <u>A Professional Development Program</u>:

The professional development program shall ensure up-dating of instructor knowledge and expertise on a continuing basis. The cycle for update training shall not exceed three years.

e) <u>An Advisory Committee:</u>

An advisory committee, adequately representing the aviation industry, to ensure that course performance objectives are current from an industry perspective, and that they satisfy industry needs for appropriately trained technical personnel. Minutes of meetings shall be recorded, and decisions reached sent to individuals or organizations

involved with changes to the program. The organization shall document, in detail, how changes to course format and content are handled. This includes, but is not limited to, content, equipment, delivery and facilities.

Note: While an advisory committee is essential for basic training organizations and is part of the quality system, formally constituted advisory committees may not be required for type training organizations.

f) A Quality Assurance System:

The quality assurance system should be a closed loop process and shall include a description of the methods used to control the:

i) development of training, including lesson plans;

ii) development of student assessment methods;

iii) competency and currency of instructional staff;

iv) presentation of course material to meet training objectives;

v) method of gathering and analyzing feedback from the course;

vi) method used to determine corrective action where necessary; and

vii) method used to monitor the results of any corrective action taken.

g) A Person Responsible for Training:

The organization shall appoint an individual to be responsible for program integrity. The responsible individual shall have a minimum of six years experience in the maintenance of aircraft, and a knowledge of maintenance training, development and delivery.

h) Examination Methods:

The organization shall implement a program to evaluate whether or not students achieve the objectives and learning outcomes of the training provided. Examination methods may include written, oral, practical, or electronic testing. Records shall be retained and made available to the Authority upon request. The TOM shall include the following policies under examination development:

i) a policy to ensure that the quantity or the weighted value of each examination is dependent upon the importance of the learned outcome, the frequency of occurrence, and the level of difficulty; and

ii) validation by an independent subject matter expert to ensure the validity, accuracy, clarity and appropriate weighting of the examinations.

Notes: 1. The completed examinations should ensure that performance objectives have been accomplished. The use of a test map or other devices should ensure that those subject areas with the greatest impact are tested to the highest level; while the subject areas, or tasks with the least impact are tested to the lowest level.

2. Independent subject matter experts may be from an outside source or members of the organization.

i) An Examination Process Control:

The organization shall establish a method of process control to ensure that:

i) new examination questions are developed if confidentiality becomes compromised;

ii) all examination material and marking guides are maintained in a secure and confidential manner;

iii) examinations are carried out in a controlled environment to protect the integrity of the evaluation process;

iv) there is consistency of examination (usually specified in the course standard);

v) post examination reviews are conducted and corrected to 100 percent;

vi) versions and/or variances of the evaluation instruments used in the initial and rewrite evaluation process are secure;

vii) the successful completion of examinations occur within 1 year following program completion;

viii) a passing grade of 60 percent or greater is established for each major subject area listed in the TOM; and

ix) limits are set for the maximum number of attempts permitted.

j) Course Prerequisites:

The course prerequisites for student admission shall be based on the need for the training organization to meet course delivery objectives.

k) Student Attendance Control:

i) The training schedules shall ensure that students do not exceed eight hours of training (or combined duty/training) in any one day, or six days or forty hours of duty/training in any seven day period. The only exceptions to these requirements are in isolated situations where, due to equipment availability, students would otherwise miss an opportunity for access to specific equipment (e.g. simulator, aircraft).

ii) The organization shall accurately document the student's attendance, ensuring that the individual's presence is recorded and controlled for each class, shop or laboratory activity. Students having missed more than 5 percent of the course through absences, shall not qualify for experience credit from a basic training course. While not qualifying for an approved course credit, students may still qualify as having completed an acceptable course in aircraft maintenance.

iii) Students shall not graduate from a type training course who have missed more than 5 percent of the course.

iv) Lost time in excess of 5 percent can be made up through documented supplementary studies, equivalent to that missed from the original program to qualify for experience credit. The TOM shall contain details on how this is achieved.

Note: The 5 percent absence policy is intended for illness, bereavement, or other circumstances beyond the individuals control.

l) Record Keeping: A system to ensure that records are maintained and retained for a period of not less than 5 years. The records shall include:

i) student attendance, performance and grades;

ii) certificate issuance;

iii) advisory committee meetings and minutes; and

iv) instructor qualifications and professional development.

m) Certificate Issuance Control:

i) A system to ensure that certificates are delivered to students who successfully complete an approved course. The certificate shall include:

A) The name and location of the training organization;

B) The type or description of training accomplished;

C) The full name of the student;

D) The date of course completion;

E) The course approval number;

F) An embossed raised seal;

G) The signature of authorized officials; and

H) For type training, the course duration in hours, and aircraft, engine, airframe or systems identification.

ii) The TOM shall include a sample of the certificate issued by the training organization to indicate successful completion of a course. The organization shall provide a current list of names and signatures of all individuals authorized to sign certificates, forms and letters to the Authority.

n) Facilities:

The organization shall provide sufficient facilities and support systems for the type of delivery consistent with the scope of the program. This shall include adequate heating, lighting and ventilation to accommodate the maximum number of students expected to be taught at any one time. The TOM shall include a simple floor plan of the primary facility showing the location of offices, classrooms, shops, etc. Where applicable, the ATO shall identify minimum facility standards for the conduct of courses at locations other than the prime facility.

o) Training Material and Instructional Aids:

i) The organization shall ensure that students have access to a current technical library in a controlled environment to support program course objectives. In addition, the organization shall make available an adequate supply of materials, shop equipment, tools (including special tools) and miscellaneous equipment used to support the training standard.

ii) Facilities, classrooms, tools and equipment shall be appropriate for the purpose for which they are to be used and shall be kept in a satisfactory condition to support the program. The training organization shall ensure the availability of any other equipment utilized within the organization or at external facilities to support their program. This may be achieved through a letter of agreement from the supplying or contracting organization. Each student shall have equal and adequate opportunity to actively participate in all learning objectives.

p) Training Material Evaluation:

A procedure to ensure that training material is sufficient and capable of supporting training objectives.

3. The training outline must be sufficient to ensure that graduating students are knowledgeable in all aspects of aircraft maintenance, inspection and regulatory subject matter. The intent of the approved program is to ensure that following successful completion of the Authority written examinations (where required) and applicable practical experience, students are prepared to assume the responsibilities and privileges of the license or rating for which the program was approved. The basic training course training standard is contained in Appendix A. Alternate methods of compliance will be reviewed on an individual basis to ensure that they meet these requirements.

Appendix A - Aircraft Maintenance Technician Licensing Course Standards

The following are the Course Training Standards for Aircraft Maintenance Technician (AMT) licence training courses.

1. Common to All Courses

Upon graduation from an approved AMT training programs, the student will be able to:

Apply:

a) Occupational health and safety practices;
b) Local governmental safety regulations;
c) Company safety regulations;
d) Use of personal safety equipment;
e) Reporting procedures for personal injuries;
f) The Lebanese Aviation Regulations applicable to an AMT; and,
g) Acceptable industry standard practices.

Explain:

a) Aircraft system operation to component level;
b) Standard practices for operational checks, inspection and certification of aircraft systems;
c) The purpose of an Aircraft Technical Log Book;
d) The purpose of an Aircraft Journey Log Book;
e) The purpose of a Type Approval Data Sheet (TADS);
f) Privileges of an Approved Maintenance Organization (AMO);
g) Delegated authority;
h) The privileges of the Aircraft Maintenance Technician (AMT)Licence;
i) Procedures and applicable standards required for structural and non-structural repairs and modifications including:
    - the purpose of a Supplemental Type Approval (STA) (*USA* - STC).
    - the Repair Design Approval (RDA) process.
j) The definition of specialized work;
k) The purpose of the Advisory Material, and
l) The effects of human factors contributing to maintenance errors.

Perform:

a) The installation and securing of fasteners and connectors;
b) An applicable sheet metal repair or modification;
c) To completion an applicable inspection for the purpose of certification;
d) A maintenance release including: log book entries, certification forms, weight and balance reports and other related documentation; and
e) log book entry procedures following repairs or modifications.
f) Tasks utilizing and interpreting technical information systems.

2. M1 Class Training Course

Upon graduation from all approved M1 Class training programs, the student will be able to:

Explain:

a) The system logic and processes used to determine, develop and maintain the appropriate maintenance schedule;
b) The procedures used to inspect and test the operation of avionics and auto-flight systems representative of those installed in M1 aircraft; and
c) Types of non-destructive inspection procedures.

Perform:
a) Servicing procedures on fixed and rotary wing aircraft;
b) Tasks utilizing minimum equipment lists; configuration deviation lists; and built in test equipment programs; and
c) scheduled and unscheduled inspections.

Test, Troubleshoot, Repair, Adjust, Remove and Replace:
a) Power plants & related systems;
b) Propeller & rotor systems;
c) Airframe & related systems;
d) Electrical systems;
e) Airframe structures; and
f) Dynamic components.

3. M2 Class Training Course

Upon graduation from all approved M2 Class training programs, the student will be able to:

Explain:
a) The procedures used to inspect and test the operation of avionics and auto-flight systems representative of those installed in M2 aircraft;
b) The system logic and processes used to determine, develop and maintain the appropriate maintenance schedule;
c) Types of non destructive inspection procedures;
d) Fault diagnostic systems typical of those installed on M2 aircraft; and
e) Mechanical and electronic systems including electrical/mechanical and digital control.

Perform:
a) Servicing procedures on fixed and rotary wing aircraft;
b) Tasks utilizing minimum equipment lists; configuration deviation lists; and built in test equipment programs; and
c) Scheduled and unscheduled inspections.

Test, Troubleshoot, Repair, Adjust, Remove & Replace:
a) Power plants & related systems;
b) Propeller & rotor systems;
c) Airframe & related systems;
d) Electrical systems;
e) Airframe structures; and
f) Dynamic components.

4. M2 Type Rating Course

Upon graduation from all approved M2 Type training programs, the student will, for the individual type or group of aircraft, be able to:

Explain:
a) The procedures used to inspect and test the operation of avionics and auto-flight systems representative of those installed in the aircraft;
b) The system logic and processes used to determine, develop and maintain the appropriate maintenance schedule;
c) Types of non destructive inspection procedures;
d) Fault diagnostic systems typical of those installed on the aircraft; and
e) Mechanical and electronic systems including electrical/mechanical and digital control.

Perform:

a) Servicing procedures on the aircraft;
b) Tasks utilizing minimum equipment lists; configuration deviation lists; and built in test equipment programs; and
c) Scheduled and unscheduled inspections.

Test, Troubleshoot, Repair, Adjust, Remove & Replace:

a) Power plants & related systems;
b) Propeller and/or rotor systems if installed on the aircraft;
c) Airframe & related systems;
d) Electrical systems;
e) Airframe structures; and
f) Dynamic components.

5. E Class Training Course

Upon graduation from an approved E Class training course the student will be able to:

Explain:

a) The system logic and processes used to determine develop and maintain the appropriate maintenance schedule;
b) Fault diagnostic systems typical of those installed on M1 & M2 aircraft;
c) The procedures used in the repair and servicing of auto-flight systems; and
d) Mechanical and electronic systems including electrical/mechanical and digital control systems.

Perform:

a) tasks utilizing minimum equipment lists; configuration deviation lists; and built in test equipment programs; and
b) installation of a navigation and communication system.

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) Communication systems;
b) Navigation systems;
c) Electrical and lighting systems;
d) Instrumentation systems; and
e) Aircraft electrical and electronic integrated systems.

6. S Class Training Course

Upon graduation from an approved S Class training course the student will be able to:

Perform:

a) Effective corrosion control and repair for aircraft structures;
b) Tasks utilizing the tools and equipment applicable to the maintenance of aircraft structures of the construction type;
c) Sealing procedures for aircraft structures;
d) Tasks incorporating the correct selection and installation of fasteners used on aircraft structures;
e) Repairs and replacement of fabric coverings if involved in the aircraft construction type; and
f) A repair scheme to meet the applicable standards.

Fabricate, assemble and repair:

a) Sheet metal, tubular, composite or wood structures as applicable to the construction type; and
b) Fluid lines and conduits.

Assemble, install and repair:

a) Transparencies (windscreens, windows, lenses, etc.) forming part of the aircraft structure.

Appendix B - M1 & M2 Topics and Curriculum Guide

This Appendix contains the items that should be included in a training outline or curriculum, for a M1 or M2 Class Aircraft Maintenance Technician licence training program. These items expand upon the Course Training Standard specified in Appendix A. This Appendix also designed to serve as a study guide for applicants who wish to take the M1 and M2 Class written examination set by the Authority.

1. **General**
   - a) Identify:
     - i) the different classes of fires and suitable extinguishers.
   - b) Explain:
     - i) the legal and moral responsibilities of an aircraft maintenance technician; and
     - ii) human factors in maintenance.
   - c) Perform:
     - i) tasks utilizing health and safety practices, including handling of chemicals, metals, pyrotechnics and hazardous materials, environmental considerations, workplace hazardous materials information system or equivalent; and
     - ii) tasks extracting information from technical drawings including the Air Transport Association (ATA) system.

2. **Hand Tools/Precision Instruments**
   - a) Perform::
     - i) tasks utilizing the proper selection and use of hand and power tools.

3. **Metallurgy**
   - a) Identify:
     - i) the types of corrosion.
   - b) Explain:
     - i) the hardness testing process;
     - ii) relevant manufacturing treatment processes of aircraft metals;
     - iii) the fundamentals of NDT processes including, visual inspection, liquid penetrate inspection, ultrasonic inspection, eddy current inspection, fluorescent penetrate, magnetic particle inspection, radiography etc.;
     - iv) the methods of corrosion treatment and prevention;
     - v) the inspection processes for welds; and
     - vi) the inspection process for bonds.
   - c) Perform:
     - i) tasks identifying the types, properties and coding of aircraft metals; and
     - ii) visual inspection and liquid penetrant inspection.

4. **Aircraft Servicing**
   - a) Explain:
     - i) servicing of aircraft systems such as water, waste, oxygen, etc.;
     - ii) the classifications, functions principles and properties of lubricants including: engine oil, grease and hydraulic fluids;
     - iii) aircraft deicing procedures;
     - iv) operating procedures and safety precautions of ground support equipment required to service the aircraft;
     - v) aircraft grooming procedures and precautions and
     - vi) aircraft storage procedures.
   - b) Perform:
     - i) a fuel contamination check;
     - ii) tire servicing and inflation;
     - iii) servicing of aircraft main batteries;

iv) servicing of lubrication, fuel, oil & hydraulic systems;
v) standard ground handling practices; and
vi) jacking of an aircraft.

5. **Approved Parts**

a) Identify:
   i) aircraft hardware using AN, MS, NAS parts systems.
b) Explain:
   i) the application of metric and British unified systems to aircraft hardware;
   ii) the needs and rationale for aircraft specifications such as MIL, NAS; and
   iii) the inventory control system including traceability, requisitioning, quarantine and bonded stores.
c) Perform:
   i) installation and securing of standard hardware and connectors

6. Aerodynamics

6.1 Fixed Wing Aircraft

Explain:

a) the theory of flight, relative motion, dynamic stability, standard atmosphere, fluid dynamics, lift, drag, thrust and weight, forces and balance, stalling/landing speeds, speed of sound, aerodynamic loads, and high speed flight; and
b) the purpose of flight controls including primary, secondary, and auxiliary controls, lift and anti-lift devices.

6.2 Rotary Wing Aircraft

Explain:

a) theory of flight applicable to rotary wing including:
   i) coriolis effect;
   ii) retreating blade stall;
   iii) auto-rotational characteristics;
   iv) transverse flow;
   v) dissymmetry of lift ; and
   vi) ground effect.

6.3 Fixed Wing Controls and Rigging

Identify:

a) types of flight controls and explain features and functions of flight control systems.

Explain:

a) mechanical flight control system and components;
b) servo powered flight control system and components;
c) cables, fittings and repair of associated rigging hardware;
d) incidence, symmetry checks and adjustments;
e) the purpose and principles of flight control artificial feel/feedback systems; and
f) the systems which modify flight control travel due to altitude, velocity or other factors e.g. rudder travel limitation, aileron lockout, and lift dump.

Perform:

a) inspection of cable and control rod type flight control system;
b) rigging of cable operated primary flight control system; and

c) a cable repair.

6.4 Rotary Wing Controls and Rigging

Explain:

a) elements of the drive train including:
   i) transmission;
   ii) clutches & freewheeling;
   iii) drive shaft systems;
   iv) gearboxes (intermediate and tail rotor);
   v) ducted fan systems including Notar and Fenistron;
   vi) gear construction, installation, types, ratios, patterns, lubrication and backlash;
   vii) bearings and seals (friction, anti-friction, elastomeric);
   viii) rotor head types and design including: rigid, semi-rigid, fully articulated; and
   ix) rotor blade design, construction and types.

b) the various fundamentals of flight control systems including:
   i) rotating controls;
   ii) non rotating controls;
   iii) forced trim;
   iv) forced gradient;
   v) swash plate;
   vi) spider system; and
   vii) servo tabs.

c) the various fundamentals of flight control rigging including::
   i) cyclic rigging;
   ii) collective rigging;
   iii) anti-torque devices;
   iv) elevators;
   v) correlation devices; and
   vi) droop compensators.

d) the fundamentals and effects of vibration.

e) vibration types and causes including:
   i) vertical;
   ii) lateral;
   iii) low frequency;
   iv) medium frequency;
   v) high frequency;
   vi) harmonics; and
   vii) nodes.

f) vibration canceling devices including::
   i) dampers; and
   ii) bifilar.

g) landing gear types and systems including:
   i) skids;
   ii) floats;
   iii) wheels;
   iv) pop out floats; and
   v) retractable gear.

h) rotor tracking and balancing requirements, analysis and rectification.

i) autorotational RPM adjustments.

j) inspection requirements including:
   i) sudden stoppage;
   ii) hard landing;
   iii) overspeed.;
   iv) over torque; and

v) periodic inspections.

k) operational safety practices including approaching and exiting a running helicopter.

l) ground crew responsibilities and precautions applicable to slinging external loads.

Perform:

a) alignment and static balance procedures for a semi-rigid rotor head.

b) tracking and dynamic balance of a main and tail rotor system using a simulator

c) the testing, troubleshooting, repair, adjustment, removal and replacement of dynamic components

7.0 Sheet Metal

Explain:

a) the difference between a structural and non-structural repair.

b) the application and installation/removal of special fasteners.

c) the requirements for scratch inspection.

d) the purpose and use of sealant.

Perform:

a) installation, inspection and removal of solid rivets.

b) installation, and removal of standard fasteners.

c) sheet metal repairs including cutting, bending, forming and fabricating.

8.0 Aircraft Structures

Identify:

a) structural members and stress involved in floats, hulls, skis, stabilizers, wings, engine mounts, cowlings and fuselages.

Explain:

a) types of primary aircraft structures.

b) the fabric surfaces and wood components including inspection, materials, process, fabric repairs, wood types, uses, and repair.

9.0 Plastics And Composites

Explain:

a) reinforcement fibers, matrix materials, core materials, manufacturing techniques composite safety, methods of curing, pre-pregs, temperature and pressure applications.

b) inspection, damage assessment and repair procedures.

Perform:

a) a repair using the following procedures: wet lay-up, and core repair.

10.0 Windows and Lenses

Explain:

a) the construction of windows and lenses.
b) inspection, repair, servicing and installation of windows and lenses.
c) damage assessment of windows and lenses.
d) handling and storage of windows and lenses.

11.0 Piston Engines

11.1 Basics

Explain:

a) the calculation of energy, work and horsepower.
b) the two stroke cycle and the Otto cycle.
c) piston engine classification terminology (e.g. TSIO-520, R985).

11.2 Cooling and Lubrication of Engines

Explain:

a) the purpose and methods of engine cooling.
b) the functions, principles and properties of lubricating oil.
c) lubrication systems including oil dilution and cold weather operations.

Perform:

a) the selection of the appropriate lubricants.

11.3 Component Parts of a Reciprocating Engine Assembly

Explain:

a) the purpose of parts including the following: crankshaft, connecting rods, bearings, pistons, cylinders, accessory/propeller gearing, valves and valve train, and crankcase.
b) the procedure for lapping valves and seats, replacing bushings, removing nicks, burrs, scratches, scores, and replacing damaged studs.

Perform:

a) disassembly, cleaning, inspection, measuring and re-assembly of the engine.

11.4 Carburetion Principles

Describe:

a) characteristics of fuel and fuel/air metering systems
b) carburetion principles and components as they apply to float type and pressure injection carburetors, single and multi-point fuel injection systems.
c) induction system principles and components as they apply to normally aspirated, supercharged and turbo charged engines.
d) the operation of turbocharger control systems.

11.5 Ignition Systems

Explain:

a) the principles of operation and identify the components of reciprocating engine ignition systems.

Perform:

a) the timing and installation of a magneto and ignition harness.
b) the inspection, servicing and testing of magneto ignition system components.

11.6 Installing, Testing, Troubleshooting Engines

Explain:

a) run-in procedures including testing and troubleshooting.
b) the purpose and procedure for engine inhibiting.

Perform:

a) engine removal and installation including installation of accessories and component systems.
b) reciprocating engine run-up.

12.0 Turbine Engines

12.1 Basics

Explain:

a) development, fundamentals and principles of operation of turbine engines.
b) engine design and construction pertaining to: inlet ducts, compressors, bleed valves, diffusers, vane controllers, combustion section, turbines, exhaust section, gear boxes, bearings and seals, engine mounts.
c) factors affecting thrust/torque.
d) the mathematics and physics relating to thrust production including the Brayton cycle and thrust calculations.
e) the purpose and advantages of modular construction.
f) common designs of turbine engines including:
    i) Torque producing Engines - Turboshaft and turboprop
    ii) Thrust Producing Engines - Turbojet and Turbofan.
g) the principles of noise suppression techniques.
h) turbine engine systems including fuel, lubrication, ignition, air, exhaust.

Define:

a) common turbine engine terminology and acronyms

12.2 Fuel Control Systems

Explain:

a) Explain fuel systems including: electronic fuel control, hydro-mechanical fuel control, pneumatic fuel control overspeed governors, fuel manifolds and nozzles, fuel heater, fuel filter, fuel system indication (flow pressure and temperature).

Perform:

a) fuel nozzle inspection, servicing, testing and safety precautions.

12.3 Ignition

Explain:

a) types and operation of turbine engine ignition systems and their components including: low tension (glow plugs), high tension (capacitive discharge), auto re-light.
b) turbine engine ignition system safety precautions.

Perform:

a) ignition systems servicing and inspection procedures.

12.4 Starting

Explain:

a) design and components of starting systems.
b) the operation of various turbine engine starters including air turbine starters, electrical starters, (motor and starter-generator).
c) inspection and servicing procedures for starting systems.
d) the operation of an auto-start system.

Perform:

a) the inspection and servicing of an electrical turbine engine starter.

12.5 Engine Controls

Explain:

a) rigging requirements for gas turbine controls and systems.
b) adjustments of fuel controls including: acceleration/deceleration check, minimum flow, maximum speed, idle speed, part power trim check and shut off.
c) mechanical, electronic interface, full authority digital engine control (FADEC) systems.

12.6 Lubrication

Explain:

a) Types And Requirements Of Turbine Oil.
b) Engine Lubrication System Principles And Component Operation Including: Wet Sump, Dry Sump, Scavenge Pumps, Pressure Pumps, Oil Filters, Bearings And Seals, Oil Pressure Regulator, Air Oil Separators, Oil Coolers, Oil Jets.
c) Contamination Monitoring System Operation Principles Including: Chip Detectors, Filters, Spectrometric Oil Analysis Program (Soap).

12.7 Exhaust

Explain:

a) types, operation and control of thrust reverse systems including hot and cold stream.
b) principles of thrust vectoring systems.
c) principles and engine trimming associated with exhaust ducts.

12.8 Air

Explain:

a) general air systems of turbine engines including the following: anti-ice air, de-ice air, bleed valves, customer bleed air, case cooling/heating (clearance control), control air, temperature and pressure regulation, filters.

12.9 Engine Indicating Systems

Explain:

a) principles and operation of engine indicating systems including:
    i) speed indication.
    ii) temperature indication.
    iii) pressure indication.

iv) flow metering systems.
v) quantity indication (oil quantity).
vi) fault detection (chip detector, filter bypass).
vii) power indication systems engine pressure ratio (EPR), torque indication.
viii) status enunciators.
ix) built in test equipment (BITE) system.
x) vibration indication.

12.10 Gear Box

Explain:

a) purpose, function and types of engine gear boxes including:
   i) accessories and accessory drives.
   ii) gear reduction systems.
   iii) attachment devices.
   iv) fault detection analysis -chip detectors and filter catchment.
   v) torque measurement system.
   vi) gear types.

12.11 Engine Water Injection

Explain:

a) the purpose and operation of water methanol injection systems.

12.12 Inspection/Servicing

Explain:

a) handling and safety precautions.
b) the purpose and procedures for trend monitoring and power checks.
c) fundamentals of vibration analysis.
d) turbine engine inspection procedures including: hot end inspection, borescope inspection.
e) the engine start and shut down procedure.
f) engine installation and test procedures.
g) requirements and procedures for compressor wash.
h) safety precautions and hazards while ground running including:

- foreign object ingestion.
- jet/prop blast.
- turbine burst.
- personnel.
- hazards created by deviation from procedures
- aircraft restraint (chocks, tie downs etc.).
- noise.

12.13 Inspection/Servicing

Perform:

a) procedures for calculating engine cycle counts.
b) a hot section inspection.
c) a simulation of a power check including calculating engine performance from manufacturer's performance charts and interpret data to determine faults such as:
   i) faulty indication.
   ii) compressor defect.
   iii) turbine defect.
   iv) fuel nozzle contamination.

v) air leaks.
vi) excessive bleed air.
vii) rigging faults.

d) engine ground run (students must be involved in live engine operation).

13.0 Propellers and Systems

Explain:

a) theory and design of aircraft propellers including: forces acting on a propeller, lift and angle of attack, propeller construction materials.
b) fixed pitch, controllable pitch, constant speed, feathering and reversing propellers.
c) methods of controlling propeller pitch including:
i) springs.
ii) counter weights.
iii) hydraulic.
iv) pneumatic.
v) electric.
vi) ground adjustable.
vii) propeller control systems including:
viii) governors.
ix) synchronizers.
x) synchrophasers.
xi) feathering and un-feathering.
xii) reversing.
xiii) un-feathering accumulators.
xiv) negative torque sensing.
xv) auto feather
d) propeller indication including:
i) speed sensing.
ii) torque sensing.
iii) blade angle indication.
e) propeller installation and maintenance including:
i) flange mount.
ii) spline shaft.
iii) taper shaft.
iv) blade repair.
v) inspection techniques.
vi) balancing.
vii) tracking.
f) propeller disassembly and re-assembly including:
i) blade installation.
ii) hub setup.
iii) electrical connection.
iv) associated systems (de-ice, beta pickups).
v) spinner backing plates.

Perform:

a) propeller installation, safe operation, inspection, adjustment and minor repair.

14.0 Hydraulic and Pneumatic Power

Explain:

a) safety precautions, including high pressure bottles and accumulators.
b) fluid dynamics, types of fluid and system components.

c) system design including multiple and integrated systems and system redundancy.
d) system maintenance.

Perform:
a) operation, inspection and testing of a hydraulic system.
b) servicing of a high pressure accumulator.

15.0 Pneumatics

Explain:
a) the differences between hydraulic and pneumatic systems.
b) the principles of operation, components, maintenance and servicing of a pneumatic system including: temperature regulation, pressure control, flow control, sources and common applications.

16.0 Aircraft Plumbing

Explain:
a) the standard fittings and hardware identification systems.

Perform:
a) assembly, installation, inspection and testing of hose and rigid tube assemblies.

17.0 Landing Gear

Explain:
a) the various types and configurations of landing gear assemblies including shock absorbing and non-shock absorbing systems.
b) the purpose and operation of shimmy dampers.
c) the operation of components of landing gear retraction and anti-retraction systems.
d) the operation and components of hydraulic and mechanical, emergency extension systems.
e) various brake types.
f) anti-skid and skid warning systems.
g) basic, boosted, power, automatic and emergency braking systems and components.
h) brake indicating systems including break wear and temperature indication.
i) mechanical and powered steering systems.
j) the purpose of air ground sensing systems.

Perform:
a) disassembly, re-assembly and servicing of an oleo.
b) removal, disassembly, visual inspection, re-assembly, servicing and installation, of wheels, tubes and tires.
c) a retractable landing gear inspection including a gear swing and functional check.
d) basic brake system inspection and servicing.
e) installation and rigging check of floats or skis.

18.0 Environmental Control Systems

Identify:

a) air sources for cabin pressurization.

Explain:

a) fundamentals of heating, cooling and ventilation systems and their components including: Air Cycle Machine, vapour cycle cooling, bleed air heating, heat exchangers, exhaust type heaters and combustion type heaters.
b) electrical/electronic equipment cooling systems.
c) cabin pressure fundamentals and components including system safety precautions and functional tests.
d) the various oxygen system fundamentals and component operation including: solid state/chemical oxygen, liquid oxygen, gaseous oxygen.

Perform:

a) the inspection and servicing of environmental control systems including: (heating systems including: exhaust type heater, combustion heater) and oxygen storage systems utilizing standard handling and safety procedures.

19.0 Fuel

Explain:

a) fuels - types, properties and additives.
b) airframe fuel system configurations and component functions including: storage, jettison, distribution, venting, grounding, indication.

Perform:

a) fuel system maintenance and safety precautions

20.0 Ice and Rain Protection

Explain:

a) causes and types of ice formation.
b) types of ice detection systems.
c) anti-ice and de-ice systems and principles of operation including: propeller/rotor, powerplant (air inlets, external sensors, fuel heaters), windshields, air data gathering devices, vents & drains, airframe surfaces and water/waste systems.
d) rain repellent systems.

Perform:

a) operation, inspection and testing of an ice protection system.

21.0 Emergency Systems

Identify:

a) the types and operation of emergency lighting systems.
b) the types of ELTs including underwater locating devices.

Explain:

a) requirements and procedures for inspecting, installing and testing of ELTs flotation device types, inspection and servicing including personal flotation devices, and airframe flotation devices.
b) emergency breathing apparatus.

21.1 Fire Protection

Describe:

a) various types of aircraft fire detection systems e.g. spot detectors, continuous loop, infra-red and ultra-violet.
b) various types of suppression and extinguishing systems and safety precautions including aircraft installed and portable.

Perform:

a) fire detection system inspection and operational test.

22.0 Electricity and Electrical/Electronic Systems

22.1 Basic Electricity DC

Explain:

a) electron theory and electrostatics
b) magnetism and electromagnetism
c) electromagnetic induction
d) units of electrical measurement
    i) voltage
    ii) current
    iii) resistance
e) sources of electrical energy
f) characteristics of series, parallel, and series/parallel circuits
g) laws and theorems utilized in DC circuit analysis
h) circuit control devices including, but not limited to:
i) switches; relays; fuses; and circuit breakers
j) capacitors and capacitance in DC circuits
k) construction and operation of diodes
l) construction and operation of transistors
m) DC motors and generator principles
n) electron theory and electrostatics.

Perform:

a) circuit calculation using laws and theorems associated with DC circuit analysis.
b) tasks utilizing a multimeter to measure voltage, resistance and current in a DC circuit.
c) calculations to substantiate the theories of Ohm's Law and Kirchhoff's Law.
d) measurement of different battery types under load and no-load conditions.
e) construction of an electromagnet.
f) construction of electrical circuits from components that are the same as those previously solved mathematically.

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) DC generator, an aircraft DC motor, an aircraft alternator.
b) test diodes and transistors for serviceability.
c) switches, relays, circuit breakers, and fuses.

22.2 Basic Electricity - AC

Identify:

a) a wiring diagram for a simple alternator circuit, then accomplish the wiring of the same circuit.

Describe:

a) AC current
b) inductive pickups.
c) the effects of capacitors in electrical circuits.
d) the use for capacitors.
e) differences between AC and DC motors.
f) the use of AC alternators in aircraft.
g) generator control units.
h) single-phase AC actuator motors.
i) three-phase AC motors.
j) the use of the common measuring devices.

Explain:

a) Principles of AC theory
b) RMS & Peak values
c) frequency, period, phase
d) use of AC measuring devices, including, but not limited to, multimeters and oscilloscopes
e) polyphase AC circuits
f) aircraft application of AC
g) inductance coils, inductors and inductance in AC circuits
h) transformers
i) capacitors and capacitance in AC circuits
j) reactance and impedance
k) resonant circuits
l) phase angle, and power factor calculations
m) frequency and phase.
n) AC generation theory, including construction and maintenance of alternators.
o) the use of the multimeters, oscilloscope and other AC measuring devices.
p) Impedance.
q) Transformers.
r) the principles of AC generation.
s) aircraft alternators.
t) voltage regulation.
u) Inverters.
v) variable-speed, constant-frequency power systems.
w) AC motors.
x) improvement of starting qualities.
y) repulsion motors.
z) synchronous motors.
aa) motor losses.
bb) power conversion methods.
cc) using diodes to convert AC to DC.

Perform:

a) circuit calculations using laws and theorems associated with AC circuit analysis.
b) tasks demonstrating the proper use of test equipment to measure voltage, current, reactance and frequency in AC circuits
c) serviceability test of a diode and a transistor
d) evaluation of lab equipment.
e) AC voltage and capacitance measurement.
f) a transformer characteristics experiment using a semi-conductor.
g) applications using an oscilloscope and other common measuring devices.
h) inspection and servicing of motors.

22.3 ELECTRICAL SYSTEMS

Identify:

a) electrical diagram symbols for control and protection devices.
b) components which make up aircraft electrical motor circuits.

Describe:

a) various types of wiring diagrams, drawings and schematic symbology.
b) basic circuit components.
c) maintenance of electrical wiring systems.
d) types of electrical control devices.
e) types of electrical circuit protection devices.
f) electrical supply and generation components.
g) maintenance of electrical power supply and generation systems.
h) aircraft indication, monitoring and lighting circuits.
i) various troubleshooting techniques.
j) electrical motor theory.
k) electrical components of a landing gear system.
l) servicing and inspection of electrical landing gear system.
m) safety procedures for maintenance of electrical systems.

Explain:

a) concepts of construction, maintenance, and operation of aircraft electrical systems

b) proper use of test equipment and support curriculum
c) wiring practices, including wire and coaxial cable specs (MIL and FAA)
d) bonding EMI/RFI suppression techniques
e) light aircraft electrical power distribution systems (single and multi engine)
f) large multi engine aircraft electrical power distribution systems.

Perform:

a) tasks using wiring diagram(s), and appropriate test equipment to troubleshoot an electrical power distribution system fault.

b) the following tasks, employing acceptable methods, techniques and practices:

- wire stripping
- soldering and desoldering
- various crimping methods
- various splicing techniques
- looming procedures
- harness and connector assembly
- wire routing, looming, clamping and lacing
- wire selection and identification
- electrical load analysis

22.3 Electrical Systems

Perform:

a) reading of electrical supply power generation systems' wiring diagrams.
b) servicing and charging of a lead acid battery in a battery shop
c) servicing and deep cycling of a nickel-cadmium battery in a battery shop
d) the installation and removal of a nickel-cadmium battery of an aircraft
e) installation and removal of a lead acid battery on an aircraft
f) construction of a basic wiring harness using acceptable methods, techniques and practices.
g) troubleshooting of various control and protection devices as required by schematic diagram of a simple aircraft circuit.
h) servicing and testing of an alternator and generator.
i) connection and testing of components to simulate an aircraft generation system.
j) troubleshooting of a given defect in an aircraft electrical system, employing the circuit diagram and appropriate test equipment.
k) inspection and testing of an aircraft motor system components.
l) testing, troubleshooting, repair, adjustment, removal and replacement of a motor, generator or alternator

22.4 Aircraft Instrumentation

Identify:

a) both mechanically operated and electrical/electronic operated .
b) instruments according to function.

Describe:

a) the vertical, and instantaneous-vertical speed indicators.
b) a vacuum pump system.
c) various display types.
d) various methods of display.
e) electrical flight instruments.
f) engine electrical indicating instruments.
g) engine instrument installation and marking.
h) testing of engine electrical indicating instruments.
i) systems that employ electrical indicating instruments.
j) maintenance of systems electrical indicating instruments.
k) the types of instruments using direct drive linkages.
l) installation of direct linkage and drive mechanisms.
m) servicing of pitot/static instruments.

Explain:

a) the reasons for using instrumentation.
b) the principles of absolute pressure measurement.
c) the principles of gauge pressure measurement.
d) the principles of differential pressure measurement.
e) Altimeters.
f) airspeed indicators.
g) Air Data Computers.
h) electrically driven instruments.
i) temperature measuring instruments.
j) gyroscopic principles.
k) the sources of power of gyroscopes.
l) gyro attitude instruments.
m) rate gyro instruments.

22.4 Aircraft Instrumentation

Explain:

a) the principles of navigation.
b) the procedures for correcting errors (compass swing).
c) the procedure for setting up test equipment.

Perform:

a) a functional check of a pitot/static system
b) draining of a pitot/static system.
c) inspections of instruments for correct installation and markings.
d) a functional check on a liquid pressure instrument system.
e) a check of aircraft instruments for correct function.
f) a functional test an exhaust gas temperature system employing suitable testing.
g) packaging of an instrument for shipping.
h) a functional check of a fuel quantity indication system.
i) a simulated compass swing.

22.5 Avionics

Identify:

a) aircraft radio antennas

Describe:

a) audio components.
b) transmission lines.

Explain:

a) radio theory
b) radio transmitters
c) radio receivers
d) superheterodyne operation
e) modulation (AM/FM)
f) digital communications
g) HF communication systems
h) VHF communication systems
i) SELCAL
j) Interphone systems (flight / service)

k) audio integration
l) passenger entertainment systems (multiplex / audio / video)
m) ELTs
n) Satellite communication systems
o) navigation principles
p) flight management systems
q) inertial navigation systems
r) inertial reference systems
s) radio navigation systems, including, but not limited to:
t) DF, VOR, ILS, GPS, DME, ATC transponder, WX radar, radio altimeters, TCAS, GPWS,
u) video displays, EFIS,EICAS, Flight Data Records, Cockpit Voice Recorders
v) frequency spectrum.
w) IFR versus VFR.
x) maximum power transfer theorem.
y) functions of audio control panels.
z) functions of communication controls.
aa) antenna fundamentals.

22.5 Avionics

Explain:

a) selective calling.
b) HUMS (Health and Usage Monitoring System).
c) avionics installation practices.
d) avionics maintenance inspections and system troubleshooting.
e) interconnections of avionics systems.

Perform:

a) Operational check and inspection of a COM T/R system and one NAV system to the LRU (Line replaceable unit) level on an avionics installation.
b) Inspection of an antenna system.
c) removal and replacement of an avionics LRU or component.
d) tasks utilizing a multimeter or equivalent to troubleshoot an avionics wiring interconnection fault.

22.6 Data Bus and Logic

Describe:

a) number systems.
b) use of electrical circuit representations to explain logic gates.
c) Boolean equations.
d) the display of digital data.
e) characteristics of integrated circuits.
f) some applications of integrated circuits.
g) use of electrical circuit representations to explain logic gates.
h) functions of computer operations.
i) aircraft digital systems.
j) Air Data Computer systems.
k) Flight Management Systems.
l) Thrust Management Systems.
m) systems testing and troubleshooting.
n) safety procedures.

Explain:

a) the difference between analog and digital systems.
b) logic gates using truth tables.

Perform:

a) determination of correct digital output, given a logic diagram with digital inputs.
b) conversion between various numbering systems.

22.7 Auto Flight Systems

Explain:

a) introduction to and system overview of:

- single and multiaxis autopilot
- flight director systems
- speed command
- stability augmentation systems
- auto throttle
- thrust management
- VNAV
-

Perform:

a) Inspection and operation check of an auto-pilot system

23.0 Maintenance Procedures

Explain:

a) inspection and maintenance requirements for private and commercial aircraft as outlined in the
b) Lebanese Aviation Regulations.
c) fundamentals and types of aircraft inspections including:
   i) periodic, annual, progressive and approved inspection programs.
   ii) abnormal occurrence (hard landing, lightning strike etc.).
   iii) special (Airworthiness Directive or Service Bulletin).
d) weight and balance procedures and requirements including:
   i) jacking.
   ii) leveling.
   iii) weighing
   iv) installed equipment list.
   v) weight and balance report.
   vi) amendment requirements.
   vii) regulatory requirements.
e) differences between fixed and rotary wing aircraft weight and balance procedures, e.g. lateral center of gravity.
f) fundamentals of quality assurance.

Perform:

a) a weight and balance procedure on an aircraft, including associated documentation.
b) completion of documentation for maintenance records including:
   i) log books.
   ii) defect lists.
   iii) technical reports.
   iv) service difficulty reporting.
c) computerized information input and retrieval.
d) a typical rotorcraft and fixed wing maintenance schedule inspection (e.g. 100 hour or annual inspection)

e) tasks utilizing Minimum Equipment Lists, Configuration Deviation Lists and built in test equipment programs

24.0 Units of Measure

Perform:

a) calculations including conversions using:
   i) Length - metres, feet, inches, statute mile, nautical mile .
   ii) Velocity - metres/sec, feet/sec., miles/hr, knots .
   iii) Weight/Mass - kilograms, pounds, ounces .
   iv) Volume - litres, pints, quarts, imperial gallons, U.S. gallons .
   v) Temperature, - Celsius, Fahrenheit, Rankine, Calvin.

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Appendix C - M2 Type Rating Topics and Curriculum Guide

This Appendix contains the items that should be included in a training outline or curriculum, for a M2 Type Rating training program. These items expand upon the Course Training Standard specified in Appendix A.

Training Outline

1. An applicant shall submit a training outline that meets the following standard. The aircraft type course must be sufficient to ensure a graduating student is knowledgeable in all aspects of aircraft maintenance and inspection for all major systems of the aircraft type, powerplant, systems or equipment being addressed, to support the privileges of the applicable license. A type training ATO may be limited in scope, or include coverage of the full aircraft and its systems. Following successful completion of the approved course, the AMT will be fully knowledgeable regarding the characteristics of the applicable topic area, particular aircraft type, or series.
2. The training shall provide system description and details of operation, component location, servicing, removal and installation, and test procedures to support a typical maintenance schedule for the aircraft type or series. Upon graduation the student will be able to:
   a) Identify and use:
      i) applicable reference manuals.
   b) Recall:
      i) safety precautions to be observed when working on or near the aircraft and its systems;
      ii) locations of principal components;
      iii) normal functions of each major system, including terminology and nomenclature;
      iv) applicable system operations and maintenance practices; and
      v) procedures for carrying out significant tasks associated with the routine servicing of the aircraft and its systems.
   c) Carry out applicable system, engine, component and functional checks:
      i) as specified in the instructions for continuing airworthiness applicable to the aircraft, engine and related systems.
   d) Utilize:
      i) the MEL/CDL, interpret reports provided by crew members and/or on-board reporting systems.
   e) Interpret:
      i) readings and indications provided by BITE and other information systems.
   f) Analyze:
      i) information for the purpose of making decisions in respect to fault diagnosis and rectification contained in the instructions for continuing airworthiness.
3. The training organization shall have available for audit, detailed supporting documents, including:
   a) the allotted number of hours per subject;
   b) the course objectives indicating level of knowledge, competency and skill to be achieved by the student;
   c) practical projects to be completed; and
   d) a schedule of the examinations or tests to be given.

4. An approved course shall have a system in place to ensure "hands-on" training is provided to support the training objectives. There shall be no less than 5 percent "hands-on" training in relation to the course duration.

5. Support for practical training requirements must include a list of instructional aids. This can be achieved with any combination of the following instructional aids:

   a) a simulator or procedures trainer of a type compatible with or similar to the aircraft;

   b) an aircraft of the type; and/or

   c) training aid mock-ups, or computer simulation systems, or any other aids which support the intent, and are of equivalent training value when used as a substitute for actual aircraft or systems.

Information Note:

The purpose of the instructional aids is to ensure that students can identify and locate all aircraft systems and components, and are able to effectively carry out inspections and functional tests of live or simulated aircraft systems.

6. Training Material & Instructional Aids:

   Student handout material and instructional guides are to be included in the course curriculum or training standard.

Information Notes

   a) Type courses delivered by approved maintenance organizations (AMOs), to support the issuance of aircraft maintenance certification authority (ACA) privileges to their own employees, are approved as part of the AMO approval process and do not require a separate ATO approval. However, if the AMO intends to provide aircraft type training to AMTs of other organizations, then an ATO approval is required.

   b) Before AMTs can exercise aircraft certification privileges within an Aircraft AMO, they must be granted Aircraft Certification Authority (ACA) as required by LAR 545. This authority will be dependent upon completion of training specified in the policy and procedures section of the AMO's policy manual.

7. One-Off Courses:

   An applicant may under special circumstances request approval for a one-time delivery of a type course (per aircraft type). For this one-off course delivery, a formal PM may not be required, however, supporting documentation must be submitted indicating the methods of compliance specified in this subsection. Second and subsequent courses must conform to all the applicable requirements specified in this Sub-part.

Information Note: The one-off courses will receive a distinctive approval number.

8. Differences Type Courses:

   a) Where an organization is engaged in the delivery of aircraft type differences training, the course prerequisites must be such that only individuals who have successfully completed an initial type course in the particular aircraft series can be considered as acceptable candidates for differences training. All subject matter of the initial aircraft type course(s), must be considered, when evaluating differences subject matter for the applicable comparative or derivative type aircraft.

9. Validation of Foreign Type Training:

   a) Foreign applicants who hold a valid license from a Contracting State who seek recognition for type training received external to the Lebanese ATO process, may request validation for this training. To this end, the applicant shall submit a graduation certificate and a transcript of the training or curriculum for evaluation, together with the applicable fees. If the training is found acceptable the Authority will confirm the validation in writing.

b) Where the Authority has identified training deficiencies in the submission, the individual will be advised of the subject matter and topic areas where additional approved training is required.

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Appendix D - E Class Topics and Curriculum Guide

This Appendix contains the items that should be included in a training outline or curriculum, for an E Class Aircraft Maintenance Technician licence training program. These items expand upon the Course Training Standard specified in Appendix A. This Appendix also designed to serve as a study guide for applicants who wish to take the E Class written examination set by the Authority.

1.0 GENERAL

Identify:

a) the different classes of fires and suitable extinguishers

Explain:

a) the legal and moral responsibilities of an AME
b) human factors in maintenance.

Perform:

a) tasks utilizing health and safety practices, including; handling of chemicals, metals, pyrotechnics and hazardous materials, environmental considerations and WHMIS or equivalent
b) tasks extracting information from technical publications including ATA system

2.0 Hand Tools/Precision Instruments

Perform:

a) tasks utilizing the proper selection and use of hand and power tools

3.0 Metallurgy

Identify:

a) the type of corrosion

Explain:

a) the methods of corrosion treatment and prevention

Perform:

a) tasks identifying the types, properties and coding of aircraft metals
b) relevant manufacturing treatment processes of aircraft metals

4.0 Aircraft Servicing

Explain:

a) concepts of servicing of aircraft systems
b) the classifications, functions principles and properties of lubricants including, engine oil, grease and hydraulic fluids.
c) aircraft deicing procedures
d) operating procedures and safety precautions of ground support equipment required to service the aircraft
e) aircraft grooming procedures and precautions

Perform:

a) basic aircraft servicing tasks
b) standard ground handling practices

5.0 Approved Parts

Identify:

a) aircraft hardware using AN, MS, NAS parts systems

Explain:

a) the application of metric and British unified systems to aircraft hardware
b) the needs and rationale for aircraft specifications such as MIL, NAS
c) inventory control including: tractability, requisitioning, quarantine and bonded stores

Perform:

a) installation and securing of standard hardware and connectors

6.0 Aerodynamics

6.1 Fixed Wing Aircraft Aerodynamics

Explain:

a) the theory of flight, relative motion, dynamic stability, standard atmosphere, fluid dynamics, lift, drag, thrust and weight, forces and balance, stalling/landing speeds, speed of sound, aerodynamic loads, and high speed flight
b) the purpose of flight controls including primary, secondary, and auxiliary controls, lift and anti-lift devices.

6.2 Rotary Wing Aircraft Aerodynamics

Explain:

a) theory of flight applicable to rotary wing including:
    i) coriolis effect
    ii) retreating blade stall
    iii) auto-rotation characteristics
    iv) dissymmetry of lift
    v) ground effect
    vi) transverse flow

6.3 Flight Controls and Rigging

Identify:

a) types of flight controls and explain features and functions of flight control systems

Explain:

a) mechanical flight control system and components
b) servo powered flight control system and components
c) cables, fittings and repair of associated rigging hardware
d) incidence, symmetry checks and adjustments
e) the systems which modify flight control travel due to altitude, velocity or other factors
f) rudder travel limitation, aileron lockout, lift dump
g) the purpose and principles of flight control artificial feel/feedback systems

7.0 Sheet Metal

Explain:

a) the difference between a structural and non-structural repair

b) the application and installation/removal of special fasteners
c) the requirements for scratch inspection
d) the purpose and use of sealant

Perform:
a) installation, inspection and removal of solid rivets
b) installation, and removal of standard fasteners
c) sheet metal repair/modification including cutting, bending, forming and fabricating

8.0 Aircraft Structures

Identify:
a) structural members and stress involved in floats, hulls, skis, stabilizers, wings, engine mounts, cowlings and fuselages
b) types of primary aircraft structures

10.0 Piston Engines

10.1 Basics

Explain:
a) basic design and theory of operation
b) the calculation of energy, work and horsepower
c) the two stroke cycle and the Otto cycle
d) piston engine classification terminology (e.g. TSIO-520)

10.2 Ignition Systems

Explain:
a) the principles of operation and identify the components of reciprocating engine ignition systems

11.0 Turbine Engines

11.1 Basics

Explain:
a) development, fundamentals and principles of operation of turbine engines
b) engine design and construction pertaining to: inlet ducts, compressors, bleed valves, diffusers, vane controllers, combustion section, turbines, exhaust section, gear boxes, bearings and seals, engine mounts
c) factors affecting thrust/torque
d) the purpose and advantages of modular construction
e) common designs of turbine engines including: torque producing engines - Turboshaft and turboprop, thrust producing engines - Turbojet and Turbofan
f) the principles of noise suppression techniques
g) turbine engine systems including fuel, lubrication, ignition, air exhaust

Describe:
a) common turbine engine terminology and acronyms

11.2 Ignition

Explain:

a) types and operation of turbine engine ignition systems and their components including: low tension (glow plugs), high tension (capacitive discharge), auto re-light
b) turbine engine ignition system safety precautions

11.3 Starting

Explain:
a) design and components of starting systems
b) the operation of various turbine engine starters including air turbine starters, electrical starters, (motor and starter-generator)
c) inspection and servicing procedures for starting systems
d) the operation of an auto-start system

11.4 Engine Indicating Systems

Explain:
a) principles and operation of engine indicating systems including:
b) speed indication
c) temperature indication
d) pressure indication
e) flow metering systems
f) quantity indication (oil quantity)
g) fault detection (chip detector, filter bypass)
h) power indication systems engine pressure ratio (EPR), torque indication
i) status enunciators
j) built in test equipment (BITE) system
k) vibration indication

11.5 Turbine Engine Safety

Explain:
a) safety precautions and hazards while ground running including:
b) foreign object ingestion
c) jet/prop blast
d) turbine burst
e) personnel
f) noise
g) hazards created by deviation from procedures - (integrated systems)
h) aircraft restraint (chocks, tie downs, etc.)

12.0 Propellers and Systems

Explain:
a) theory and design of aircraft propellers including: forces acting on a propeller, lift and angle of attack, propeller construction materials
b) fixed pitch, controllable pitch, constant speed, feathering and reversing propellers

13.0 Hydraulic Power

Explain:

a) safety precautions, including high pressure bottles and accumulators
b) fluid dynamics, types of fluid and system components
c) system design including multiple and integrated systems and system redundancy
d) system maintenance

14.0 Pneumatic Power

Explain:

a) the differences between hydraulic and pneumatic systems
b) the principles of operation, components, maintenance and servicing of a pneumatic system including: temperature regulation, pressure control, flow control, sources and common applications

15.0 Aircraft Plumbing

Explain:

a) the standard fittings and hardware identification systems

16.0 Landing Gear

Explain:

a) the various types and configurations of landing gear assemblies and systems

17.0 Environmental Control Systems

Identify:

a) air sources for cabin pressurization

Explain:

a) fundamentals of heating, cooling and ventilation systems and their components including: Air Cycle Machine, vapour cycle cooling, bleed air heating, heat exchangers, exhaust type heaters and combustion type heaters
b) electrical/electronic equipment cooling systems
c) cabin pressure fundamentals and components including system safety precautions and functional tests
d) the various oxygen system fundamentals and component operation including: solid state/chemical oxygen, liquid oxygen, gaseous oxygen

18.0 Fuel

Explain:

a) fuels - types, properties and additives
b) airframe fuel system configurations and component functions including, storage, jettison, distribution, venting, grounding, indication

19.0 Ice and Rain Protection

Explain:

a) causes and types of ice formation
b) types of ice detection systems
c) anti-ice and de-ice systems and principles of operation including: propeller/rotor, powerplant (air inlets, external sensors, fuel heaters), windshields, air data gathering devices, vents & drains, airframe surfaces and water/waste systems
d) rain repellent systems

19.0 Emergency Systems

Identify:

a) the types and operation of emergency lighting systems
b) the types and operation of emergency evacuation slides and rafts
c) the types of ELTs including underwater locating devices

Explain:

a) requirements and procedures for inspecting, installing and testing of ELTs
b) emergency breathing apparatus

19.1 Fire Protection

Describe:

a) various types of aircraft fire detection systems e.g. spot detectors, continuous loop, infra-red and ultra-violet
b) various types of suppression and extinguishing systems and safety precautions including aircraft installed and portable

20.0 Maintenance Procedures

Explain:

a) inspection and maintenance requirements for private and commercial aircraft as outlined in the Lebanese Aviation Regulations
b) fundamentals and types of aircraft inspections including:
c) periodic, annual and approved inspection programs
d) abnormal occurrence (hard landing, lightning strike, etc.)
e) special (Airworthiness Directive or Service Bulletin)
f) weight and balance procedures and requirements including:
    i) jacking
    ii) leveling
    iii) weighing
    iv) installed equipment list
    v) weight and balance report
    vi) amendment requirements
    vii) regulatory requirements

g) differences between fixed and rotary wing aircraft weight and balance procedures, e.g. lateral center of gravity
h) fundamentals of quality assurance

Perform:
a) a weight and balance procedure on an aircraft, including associated documentation
b) completion of documentation of maintenance records including:
   i) log books
   ii) defect lists
   iii) technical reports
   iv) service difficulty reporting
c) computerized information input and retrieval
d) tasks utilizing Minimum Equipment Lists, Configuration Deviation Lists and built in test equipment programs

21.0 Imperial and Related Units

Perform
a) calculation including conversions using:
b) Length - Feet, Inches, Statue Mile, Nautical Mile
c) Velocity - feet/sec., Miles/Hr., Knots
d) Weight/Mass - Pounds, Ounces
e) Volume - Pints, Quarts, Imperial Gallons, U.S. Gallons
f) Temperature - Fahrenheit, Celsius, Rankine, Calvin

22.0 DC Theory

Explain:
a) DC Theory.
b) Electron Theory.
c) Magnetism.
d) Potential Difference and Capacitance.
e) Current and Resistance.
f) Electrical Measurements.
g) Sources of Electrical Energy.
h) Magnetic Effects of Electric Current.
i) Inductance Fundamentals.
j) Direct Current Generators and Motors.
k) Synchros (Synchronous transmitters, Receivers and Resolver).
l) Traducers.
m) DC CCTs & Analysis.

Identify:
a) Sources of Electrical Energy.
b) Direct Current Measuring Devices.

Describe:
a) Electrical Switches.

23.0 AC Theory

Explain:
a) Alternating Current (AC) Theory.
b) AC Generators, Motors and Transformers - Theory.

c) Synchros (Synchronous transmitters, Receivers and Resolver) .
d) Transducers.
e) RCL\RC\RL Circuits.
f) Resonant Circuits.
g) Capacitance Fundamentals.

Identify:
a) AC Measuring Devices.
b) Vacuum Tube Devices.

24.0 Analog Theory

Explain:
a) Semiconductor Devices.
b) Semiconductor - Theory.
c) Diodes.
d) Transistors.
e) Power Supplies.
f) Rectification.
g) Filtering.
h) Regulation.
i) Controls.

25.0 Digital Theory Principles

Explain:
a) Integrated Circuits (LSI, CMOS).
b) Special Application IC's.
c) Pulse Techniques.
d) Pulse Parameters.
e) Pulse Modulation (PAM, PWM, RPM, PCM).
f) Multivibrators (Monostable, astable, bistable).
g) Boolean Algebra.
h) Basic Laws and expressions.
i) Numbering Systems.
j) Decimals.
k) Binary.
l) Hexadecimal.
m) Octal.
n) Conversions.
o) Binary Computations.
p) Digital Electronics Techniques.
q) Logic gates (AND, OR, Invert, NAND, NOR, COMP).
r) Application of logic gates (Decoder, AD/DA, Multiplexing).
s) Application of Basic Digital/Microcomputer technology.
t) Microprocessors/Data transfer between systems.
u) Summing Amplifiers (Operational Amplifiers).
v) Differentiators.
w) Integrators.
x) Servo Loops.
y) Application of Control Systems e.g. powerplant, flight control, landing gear.
z) Integrated Circuits (LSI, CMOS).
aa) Special Application IC's.

Perform:

a) Binary Computations and conversions.

26.0 Maintain Communication Systems

Identify:

a) ELTs.
b) Radio Antennas.
c) Communications.
d) VHF Communications.
e) SELCAL.

Describe:

a) Acceptable Standards.

Explain:

a) Radio - Theory.
b) Amplifiers.
c) Oscillators.
d) Filters.
e) Mixers.
f) Modulation.
g) Radio Antennas.
h) Radio Transmitters and Receivers.
i) Troubleshooting Techniques.
j) Remote Radio Channeling.
k) Digital Communications
l) H.F. Communications.
m) VHF Communications.
n) SELCAL
o) Interphone, including, flight , service, audio Integration.
p) Passenger Entertainment (Multiplex audio and video).
q) Air/Ground Radio Telephone.
r) ELTs - Sat Comm.
s) Aircraft Systems Troubleshooting, including.
    i) Ramp Testing & Troubleshooting Communication Equipment.
    ii) Locating & Repairing Predetermined Faults.

Perform:

a) Installation of Avionics Systems including:
    i) Avionics Systems including.
    ii) Equipment Tray.
    iii) Wire Installation.
    iv) Antenna Installation.
    v) Line Replaceable Unit.
b) Electrical Load Analysis.
c) Weight & Balance Amendment.
d) Maintenance Release/Conformity Certificate.
e) Journey & Technical Log Entries.
f) Functional check of H.F. Communications, VHF Communications systems.

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) ELTs.

b) Radio Antennas.
c) H.F. Communications.
d) VHF Communications .

27.0 Maintain Navigation Systems

Describe:

a) Acceptable Standards.

Explain:

a) Navigation Principles.
b) Navigation Antennas.
c) Standard Practices.
d) Flight Management Systems.
e) Inertial Navigation Systems.
f) Inertial Reference.
g) Radio Navigation
    i) ADF
    ii) VOR
    iii) Localizer
    iv) Glide Slope
    v) Marker Beacon
    vi) Horizontal Situation Indicator/R.M.I
    vii) Area Nav
h) LORAN.
i) Hyperbolic Navigation Principles.
j) Global Positioning Systems.
k) Aircraft system troubleshooting including:
    i) Ramp Testing & Troubleshooting Navigation Equipment
    ii) Locating & Repairing Predetermined Faults

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) The following systems, including its associated antennas:
    i) ADF
    ii) VOR
    iii) Localizer
    iv) Glide Slope
    v) Marker Beacon
    vi) Horizontal Situation Indicator/R.M.I.
    vii) Area Nav.
    viii) Global Positioning Systems

Perform:

a) Avionics System Equipment Tray Installation.
b) Wire Installation.
c) Antenna Installation.
d) Installation of Line Replaceable Unit.
e) Electrical Load Analysis.
f) Weight & Balance Amendment.
g) Maintenance Release/Conformity Certificate.
h) Journey & Technical Log Entries.

28.0 Maintain Pulse Systems

Explain:

a) Radar Navigation systems including:
b) Introduction to Microwave Principles & Pulse Techniques.
c) Weather Radar.
d) DME Interrogator.
e) ATC Transponder.
f) TCAS.
g) Radio Altimeter (LRRA).
h) Doppler Principles.
i) GPWS.
j) Troubleshooting Aircraft Systems, including:
    i) Ramp Test & Troubleshoot Pulse Systems.
    ii) Locate & Repair Predetermined Faults.
k) Avionics System Installation, including:
    i) Equipment Tray Installation.
    ii) Wire Installation.
    iii) Antenna Installation
    iv) Line Replaceable Unit

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) Radar Navigation Systems, including:
    i) Weather Radar.
    ii) DME Interrogator
    iii) ATC Transponder.
    iv) Radio Altimeter (LRRA).

29.0 Maintain Auto Flight Control Systems

Explain:

a) Introduction and System Overview of:
    i) Yaw Damper System.
    ii) Flight Director
    iii) Autopilot.
    iv) Speed Command.
    v) Auto Throttle.
    vi) Standard Practices.
    vii) VNAV.
    viii) Stability Augmentation System.
b) Aircraft Systems Troubleshooting, including:
    i) Ramp Testing & Troubleshooting of Auto Flight Equipment.
    ii) Locating & Repairing Faults

30.0 Maintain Electrical Systems

Explain:

a) Proper Use of Test Equipment to Support Curriculum.
b) Wiring Practices, including Wire and Co-Axial Cable Specifications (MIL & FAA) .
c) Drawing and Schematic Symbology.
d) Bonding EMI/RFI Suppression Techniques.

Perform:

a) Wire Stripping.
b) Soldering/De-soldering.
c) Crimping Methods (various).

d) Splicing Techniques (various).
e) Looming Procedures.
f) Plugs, Receptacles and Connectors procedures.
g) Physical Protection Devices Techniques.
h) Potting Techniques.
i) High Reliability Techniques.
j) Routing/lacing/Clamping techniques.
k) Wire Identification.
l) Wire selection.
m) Electrical Load Analysis.
n) Weight & Balance Amendment.
o) Maintenance Release/Conformity Certificate.
p) Journey & Technical Log Entries.
q) Controls (Voltage regulators and protection devices).

Troubleshoot Aircraft Systems Including:

a) Ramp Test & Troubleshoot Electrical Systems.
b) Locate & Repair Predetermined Faults.
c) Service Batteries.
d) Test DC Generation, including Controls (Voltage regulators and protection devices) and Inverters.
e) Label, Test, Troubleshoot and Repair:
    i) AC Generation.
    ii) Introduction.
    iii) Alternators (AC. generators).
    iv) DC Generation
    v) Introduction
    vi) Generators.
    vii) Electrical System Wire Installation Component and Battery Installation.
f) Describe Electrical System Installation, including Acceptable Standards.
g) Describe Electrical Power Systems Monitoring Devices.

31.0 Maintain Instrument Systems

Describe:

a) Acceptable Standards.

Explain:

a) Air Data Systems and Instrumentation, including:
    i) Pitot and Static System Check .
    ii) Central Air Data Computing System.
    iii) Air Data Instruments (MACH/IAS, VSI/IVSI, BARO ALTM).
    iv) Air Temperature Instruments.
    v) Mach-Airspeed Warning.
b) Attitude and Direction, including:
    i) Introduction to Gyroscopic and Flux Valve Principles.
    ii) Gyrosyn Compass System/Magnetic Compass.
    iii) Attitude Reference Systems.
    iv) Turn and Bank/Turn Coordinator/Slip Indication.
    v) Standby Artificial Horizon.
    vi) Laser Gyro.
    vii) Attitude Director Indicators.
    viii) Video Displays.
    ix) EFIS.

c) Flight data & Voice Recorder, including:
   i) System Requirement.
   ii) System Operation & Testing.
   iii) Underwater Acoustic Beacon Operation and Testing.
d) Compass Swing.
e) Data Bus Systems.
f) the Installation of Instrument System including.
   i) Equipment Installation.
   ii) Wire Installation.

Perform:

a) Electrical Load Analysis (if applicable).
b) Weight & Balance Amendment.
c) Maintenance Release/Conformity Certificate.
d) Journey & Technical Log Entries.
e) Compass Swing.
f) Installation of Instrument System including Equipment and Wire Installation.

Test, Troubleshoot, Repair, Adjust, Remove and Replace:

a) Ramp Test & Troubleshoot Instrument Systems.
b) Locate & Repair Predetermined Faults.
c) Air Data Systems and Instrumentation, including:
   i) Pitot and Static System and Check.
   ii) Central Air Data Computing System.
   iii) Air Data Instruments (MACH/IAS, VSI/IVSI, BARO ALTM).
   iv) Gyrosyn Compass System/Magnetic Compass.

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Appendix E - S Class and Construction Type Rating Topics and Curriculum Guide

This Appendix contains the items that should be included in a training outline or curriculum, for an S Class and Construction Type Rating, Aircraft Maintenance Technician licence training program. These items expand upon the Course Training Standard specified in Appendix A. This Appendix also designed to serve as a study guide for applicants who wish to take the S Class and Construction Type Rating written examination set by the Authority.

S Class Training Requirements

1.0 Safety

Identify:

a) potential health hazards.
b) potential fire hazards.
c) types and classes of fires.

Apply: (to comply with standard)

d) Workplace Hazardous Materials Information System (WHMIS).
e) use of Material Safety Data Sheets (MSDS).
f) the effects of human factors contributing to maintenance errors.

2.0 Regulation and Documentation

Explain:

a) privileges of an Approved Maintenance Organization (AMO).
b) the definition of specialized work.

Apply: (to comply with standard)

a) applicable sections of the Lebanese Air Regulations (LARs).
b) log book entry procedures following repairs or modifications.

3.0 Technical Information

Review:

a) the Air Transport Association Specification No. 100 (A.T.A. Spec. No. 100 System).
b) the General Aviation Manufacturers Association (GAMA) Specification No. 2.
c) Maintenance Manuals (MM).
d) Illustrated Parts Catalogs (IPC).
e) Structural Repair Manuals (SRM).
f) the FAA Manual AC-43.13 (*USA*).
g) the Military Specifications (MIL-Spec's) *(USA*).
h) the National Aeronautical Standards (NAS) *(USA).*
i) Service Bulletins (SB's).
j) Alert Bulletins (AB's).
k) shop records, work orders or similar documentation.
l) technical drawings.
m) aircraft hardware standards, i.e. AC, AN, MS, NAS and OEM standards.
n) the Society of Automotive Engineers (SAE) Aeronautical Material Specifications (AMS).
o) original equipment manufacturers (OEM) specifications.

4.0 General

Explain:

a) privileges and responsibilities of a "S" licensed A.M.E.
b) English measurement system.
c) shop mathematics.
d) basic physics.
e) aircraft on ground (AOG) priority procedures.
f) North American drafting standard (third-angle projection).
g) world drafting standard (first-angle projection)
h) title blocks.
i) list of materials.
j) notes and specifications.
k) revision and application blocks.
l) fastener codes.
m) types of projections, i.e. perspective, orthographic and isometric.
n) schematic diagrams.
o) lines used in drawings.
p) dimensions and tolerances.

Perform:

a) blueprint reading.
b) drawing shop sketches.
c) storing and handling of aircraft materials.

5.0 Aircraft Systems

Explain:

a) fixed and rotary wing theory of flight.
b) aircraft flight control systems.
c) aircraft propulsion systems.
d) hydraulic and pneumatic systems.
e) landing gear systems.
f) environmental systems.
g) ice protection systems.
h) fire protection systems.
i) emergency systems.

6.0 Tools and Equipment

Utilize:

a) Hand tools such as:
    i) measuring devices.
    ii) approved marking methods.
    iii) lay-out devices, i.e. templates.
    iv) lights and mirrors.
    v) clamping devices.
    vi) cutting tools, i.e. saws. files, shears, reamers, chisels, scrapers etc.
    vii) boring tools, i.e. drill bits, countersinks, counterbores, fly cutters.
    viii) abrasives.
    ix) punches.
    x) hole finders.
    xi) de-burring tools.
    xii) chassis punches.
    xiii) hammers and mallets.
    xiv) pliers.

xv) sidecutters.
xvi) screwdrivers.
xvii) internal wrenching tools.
xviii) open-end and box wrenches.
xix) socket wrenches.
xx) torque-limiting wrenches.
xxi) special wrenches, i.e. ratcheting box wrench, flare-nut wrenches.
xxii) safety-wire twisters.
xxiii) cotter pin pullers.
xxiv) sealing guns.
xxv) suction cups.
xxvi) tube benders.
xxvii) tube beaders.

b) Machine tools such as:
i) Portable drill motors.
ii) Drill presses.
iii) Routers.
iv) Ketts saws.
v) Jigsaws.
vi) Grinders.
vii) Dimpling machines.
viii) Beading machines.
ix) Foot and power squaring shears.
x) Throatless shears.
xi) Bench bending brakes.
xii) Press brakes.
xiii) Punch presses.
xiv) Slip-roll formers.
xv) Wheeling machines.
xvi) Flanging machines.
xvii) Power planishing hammers.
xviii) Shrinkers and Stretchers.
xix) Band saws.
xx) Cut-off saws.
xxi) Pneumatic rivet guns.
xxii) Blind rivet pullers.
xxiii) Portable and fixed rivet squeezers.
xxiv) Pneumatic squeeze guns.
xxv) Pneumatic broach guns.
xxvi) Rivet shavers.
xxvii) Spot welders.
xxviii) Tube bending machines.
xxix) Hot bonders.
xxx) Sanders.
xxxi) Table (bench) saw.
xxxii) Jointer.

7.0 Airframe Structures and Designs

Explain:

a) types and missions of fixed and rotary wing aircraft.
b) major assembly breakdown of fixed and rotary wing aircraft.
c) forces acting on an aircraft in flight and on the ground.
d) truss type fuselage construction.
e) monocoque and semi-monocoque type fuselage construction.
f) types of wing and rotor arrangements and construction.
g) types and arrangements of landing gears.

8.0 Structural Materials

Identify:

a) ferrous metals.
b) non-ferrous metals.
c) types of composites.
d) composite materials.
e) aircraft quality wood.
f) wrought aluminum alloys.
g) titanium alloys.
h) Monel.
i) stainless steel.
j) chrome-Molybdenum steel.
k) Superalloys (high temperature).
l) markings on ferrous and non-ferrous sheet metal.
m) markings on ferrous and non-ferrous tubing.

9.0 Heat Treatment

Explain:

a) solution heat treatment.
b) precipitation heat treatment.
c) quenching.
d) natural aging.
e) artificial aging.
f) normalizing.
g) annealing.
h) hardening.
i) tempering.
j) work hardening.

10.0 Corrosion Control

Identify:

a) causes of corrosion.
b) locations susceptible to corrosion.
c) surface corrosion.
d) Intergranular corrosion.
e) exfoliation.
f) stress corrosion.
g) dissimilar metal (galvanic) corrosion.
h) concentration cell corrosion.
i) fretting corrosion.

j) magnesium corrosion.
k) Filiform corrosion.
l) nickel and chrome plating processes.
m) galvanizing
n) metal spray coating..
o) metal cladding.
p) anodizing.
q) corrosion removal methods on high-strength steel.
r) acceptable cleaning processes.

Apply:
a) conversion coatings.
b) primers and paints.
c) water displacing compounds.
d) leveling compounds.
e) sacrificial anodes.

Perform:
a) mechanical corrosion removal, i.e. abrasive blasting.
b) chemical treatment of corroded areas.
c) polishing of metal surfaces.

11.0 Damage Assessment

Explain:
a) scanning and detail inspection.
b) limitations of dye penetrant inspection.
c) magnetic particle inspection (MPI).
d) radiography (X - ray).
e) ultrasonic inspection.
f) Eddy Current inspection.
g) infrared thermography.
h) lifting and shoring procedures.
i) impact damage and force travel.
j) fire damage indications.

Perform:
a) corrosive substances inspections, i.e. mercury and acids.
b) lightning strike inspections.
c) abnormal flight load inspections.
d) heavy landing and tail strike inspections.
e) bird strike inspections.
f) aging aircraft checks (SSID).
g) composite delamination inspections.

12.0 Fluid Lines and Conduits

Explain:
a) fluid lines identification codes.
b) pressure, return, breather and drain lines.
c) rigid fluid lines (pipes).
d) semi-rigid fluid lines (tubes).
e) acceptable pipe and tubing materials.
f) minimum bend allowance for thin walled tubing.

g) acceptable bend distortion limits.
h) standard threaded pipe and tube fittings.
i) acceptable flaring angles.

Perform:

a) tube and pipe cutting.
b) bending of thin walled tubing using distortion limiting materials, i.e. sand, rosin or bending alloys.
c) bending of thin walled tubing using distortion limiting devices, i.e. mandrels, coil springs or bending blocks.
d) bending of thin walled tubing using hand benders.
e) bending of thin walled tubing using bending machines.
f) swaging of fittings.
g) selection and attaching of flared fittings.
h) flaring using single-flare method.
i) flaring using double-flare method.
j) pressure testing of completed assemblies.
k) drilling of drain holes in conduits.
l) beading of breather or drain lines

13.0 Thermoplastics

Identify:

a) acceptable transparent thermoplastic materials.

Explain:

a) inspection of installed windows and lenses with prisms.
b) installation precautions for plastic windows and lenses.
c) repair or replacement evaluation.
d) storage and surface protection.
e) cleaning/buffing procedures and precautions.

Perform:

a) cutting of various plastic materials.
b) gluing of various plastic materials.
c) heat treatment of plastic glue joints.
d) cold and hot forming of plastic windows and lenses.
e) drilling with special drill bit angles.
f) crack repairs.
g) hole repairs.
h) installations of plastic windows and lenses.

Wood Type Construction Rating Training Requirements

14.0 Wood Repairs

Identify:

a) acceptable methods, techniques, and practices from AC 43.13.
b) acceptable solid aircraft woods.
c) acceptable aircraft plywoods.
d) acceptable defects in aircraft woods.
e) limitations on spar repairs.
f) visual inspection procedures.
g) stress inspection procedures.
h) visual indications of decay, i.e. dry-rot.
i) indications of separated glue joints.
j) indications of deteriorated glue joints.
k) causes of cracks, i.e. checks, shakes, splits.
l) causes of compression failure.

Apply:

a) doublers and re-enforcement plates.
b) bonding agents (glues).
c) wood sealers by brushing or spraying.

Perform:

a) cutting of scarf joints.
b) acceptable glue joint surface preparation.
c) splicing of solid wood members, i.e. spars, ribs.
d) plywood skin repairs, i.e. overlay, splayed, plug, and scarf patches.
e) re-finishing of repaired wood structures.

15.0 Fabric Repairs

Explain:

a) acceptable organic fabrics and grades.
b) acceptable inorganic (synthetic) fabrics and grades.
c) traditional methods of attaching fabric, i.e. rib-stitch, screws, blind rivets, clips.
d) methods of re-covering components, i.e. envelope etc.
e) acceptable coating materials (dopes), i.e. Nitrate, Butyrate.
f) purpose of fungicidal additives.
g) acceptable solvents and thinners.
h) purpose of retarders.
i) causes of blushing.
j) methods of ultraviolet-ray (UV) protection.
k) purpose of rejuvenators.
l) approval requirements (STA or STC) for proprietary covering materials.
m) causes of fabric deterioration.
n) visual indications of fabric coating deterioration, i.e. peeling, ring-worms.
o) methods of testing fabric strength.
p) repair or replacement evaluation.

Apply:

a) proprietary coating materials by brushing and spraying.
b) reinforcing and surface tapes.
c) primers and paint.

Perform:

a) testing of fabric covered aircraft components with hand testing equipment, i.e. Seyboth, Maule.
b) machine sewing of fabric panels.
c) doped-on panel repairs.
d) sewn-in patch repairs.
e) fabric rejuvenation procedures.
f) shrinking of synthetic fabric by heating.
g) installation of grommets and inspection rings.

Tubular Type Construction Rating Training Requirements

16.0 Tubular Repairs (welding excluded)

Identify:

a) acceptable methods, techniques, and practices from AC 43.13.
b) inspection methods for internal corrosion.
c) steel parts that are not permitted to be repaired by welding.
d) support of tubular structure for repair, i.e. holding fixtures and jigs.
e) acceptable replacement materials.
f) cold-straightening limits for bent tubing.
g) repair or replacement evaluation.

Apply:

a) internal corrosion protection oils or water displacing compounds.
b) external corrosion protection primers and paints.

Perform:

a) cold removal of dents in thin walled steel tubing.
b) removal of damaged tubing.
c) cutting and fitting for splicing of replacement tubes by inner-sleeve and outer-sleeve method.
d) cutting of scarf joints.
e) cutting of fishmouth joints.
f) drilling for rosette welds.
g) fabrication of surface patches for dents or holes.
h) fabrication of finger patches for cluster repairs.
i) alignment checks.

Sheet Metal Type Construction Rating Training Requirements

17.0 Sheet Metal Repairs

Describe:

a) acceptable methods, techniques, and practices from AC 43.13.
b) inspection for repair or replacement assessment.
c) support of aircraft components during repair, i.e. jigs or fixtures.
d) selection of acceptable repair material.
e) permissible fastener edge distance margins.
f) minimum and maximum fastener spacing in pitch and gauge.
g) acceptable oversizing of fastener holes.

h) minimum allowable sheet thickness for countersinking.
i) calculation of number of fasteners required using the rivet formulae.
j) minimum bend-radii.
k) acceptable rivet dimensions after bucking.

Apply:
a) alignment check procedures during repairs.
b) aerodynamic smoothers.
c) sealing compounds.
d) corrosion inhibiting primers.

Perform:
a) removal of rivets and special fasteners.
b) removal of damaged parts.
c) stop-drilling of cracks.
d) deburring of sheet metal edges.
e) cutting of corner radii.
f) calculation of bend allowances.
g) fastener hole preparations, i.e. pre-drilling, reaming and broaching (cold working).
h) locating of blind holes.
i) driving and bucking of solid rivets.
j) installation of blind rivets and bolts.
k) installation of bolts, washers and nuts.
l) skin repairs with surface and flush patches.
m) repairs by splicing.
n) installation of doublers.
o) corrugated skin repairs.
p) re-balancing of control surfaces after repairs.
q) return to service inspections.

18.0 Standard and Special Fasteners

Identify:
a) standard aircraft screws.
b) standard aircraft bolts.
c) special (OEM) aircraft bolts.
d) special blind bolts.
e) standard aircraft plain and locking nuts.
f) special aircraft nuts, i.e. Tinnerman, anchor, blind nuts, etc.
g) plain and special aircraft washers.
h) locking devices, i.e. cotter pins, safety wire.
i) straight and taper pins.
j) standard solid aircraft rivets.
k) special blind rivets.
l) panel and cowling fasteners.

19.0 Sheet Metal Fabrication

Explain:
a) protection of sheet metal from damage during production.
b) transfer of measurements from sample or technical drawing.

c) lay-out procedures.
d) flat pattern lay-out.
e) templates.
f) drilling jigs and assembly fixtures.

Perform:
a) sheet metal cutting by hand and machine cutters.
b) punch press operation for blanking of sheet metal.
c) routing of sheet metal blanks.
d) drilling or punching of relief holes.
e) edge deburring procedures.
f) sheet metal bending with hand and power brakes.
g) rolling of sheet metal with hand and power slip rolls.
h) joggling of flat sheets and flanges.
i) shrinking and stretching of flanged sheet metal.
j) forming of sheet metal with rubber punch press.
k) forming of sheet metal with stretch press.
l) forming of sheet metal with wheeling machines.
m) sheet metal bumping.

Composite Type Construction Rating Training Requirements

20.0 Composite Repairs

Explain:
a) personal hygiene protection methods specific to composites.
b) personal protection devices.
c) absence of universal repair standards.
d) fiber materials, i.e. glass, armada, graphite, carbon, boron, metal.
e) warp and woof (a.k.a. fill or weft) threads.
f) lay-up warp clock.
g) types of fabric weaves.
h) unidirectional fibers.
i) honeycomb core materials.
j) solid core materials.
k) foam core materials.
l) cold curing and thermosetting matrix resins.
m) damage assessment methods, i.e. coin tapping, ultrasonic, X-ray, thermography, acoustic emission.
n) repair or replacement evaluation.
o) OEM specified repair methods, i.e. riveted patches, cold-, hot-bonding, autoclave.
p) repair resins (Matrix materials).
q) OEM specified core filling limits.
r) pre-impregnated fabrics (B - state).

Perform:
a) delamination detection by coin tapping.
b) vacuum bagging.
c) hot bonding.
d) delamination repairs.
e) routing with templates.
f) core replacement repairs with honeycomb or balsa wood.
g) core replacement repairs with syntactic foam.

h) core replacement repairs with microballoons.
i) removal of entrapped water.
j) surface scratch removal.
k) priming and painting.
l) cleaning and polishing.
m) re-balancing of control surfaces after completed repairs.

21.0 Composite Fabrication

Explain:

a) master mould construction methods.
b) autoclave curing procedures.
c) curing steps and cycles.
d) mould removal methods.

Apply:

a) mould polishes.
b) mould release agents.
c) ultraviolet ray (UV) protection.
d) lightning strike protection, i.e. metal spray, discharge devices.

Perform:

a) edge trimming of cured composites.
b) final inspections.
c) priming and painting.

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Appendix F - Aircraft Maintenance Experience Sample Tasks List M, E & S Class

Aircraft Maintenance Experience Sample Tasks
(by Air Transport Association Chapter 100 Code)

These sample tasks represent a cross section of experience which apply to M-1, M-2, E and S Class. While the Air Transport Association (ATA) code is not meant to address light aircraft, it does lend itself to easy reference and has been adopted for that purpose.

Some tasks apply to each rating, while others are clearly exclusive to one. License candidates should review the list for applicability to the type, or series, of aircraft on which they are logging experience. In most instances, the list emulates that which is contained in the Lebanese AMT Personal Logbook.

Once a task has been completed it should be entered in the trainee's log book and certified as specified in s407.05.

ATA: 05 (Time limits & maintenance checks)
100 hour check (general aviation aircraft).
"B" or "C" check (transport category aircraft).
Review records for compliance with airworthiness directives.
Review records for compliance with component life limits.
Inspection following heavy landing.
Inspection following lightning strike.

ATA: 06 (Dimensions/areas)
Locate component(s) by station number.
Perform symmetry check.

ATA: 07 (Lifting and shoring)
Jack aircraft nose or tail wheel.
Jack complete aircraft.
Sling or trestle major component.

ATA: 08 (Leveling/weighing)
Level aircraft.
Weigh aircraft.
Prepare weight and balance amendment.
Check aircraft against equipment list.

ATA: 09 (Towing and taxiing)
Tow aircraft.
Taxi aircraft.

ATA: 10 (Parking and mooring)
Tie down aircraft.
Park, secure and cover aircraft.
Position aircraft in dock.
Secure rotor blades.

ATA: 11 (Placards and markings)
Check aircraft for correct placards.
Check aircraft for correct markings.

ATA: 12 (Servicing)
Refuel aircraft.
Defuel aircraft.
Check tire pressures.
Check oil level.
Check hydraulic fluid level.
Check accumulator pressure.
Charge pneumatic system.
Grease aircraft.

Connect ground power.
Service toilet/water system.
Perform pre-flight check.

ATA: 18 (Vibration and noise analysis)
Analyze helicopter vibration problem.
Analyze noise spectrum.

ATA: 21 (Air conditioning)
Replenish vapour system.
Replace combustion heater.
Replace outflow valve.
Replace vapour cycle unit.
Replace air cycle unit.
Replace cabin blower.
Replace heat exchanger.
Replace pressurization controller.
Clean outflow valves.
Check operation of air conditioning/heating system.
Check operation of pressurization system.
Troubleshoot faulty system.

ATA: 22 (Auto flight)
Install servos.
Rig bridle cables.
Replace controller.
Replace amplifier.
Check operation of auto-pilot.
Check operation of auto-throttle.
Check operation of yaw damper.
Check and adjust servo clutch.
Perform autopilot gain adjustments.
Perform mach trim functional check.
Troubleshoot faulty system.

ATA: 23 (Communications)
Replace VHF com unit.
Replace HF com unit.
Replace existing antenna.
Install new antenna
Replace static discharge wicks.
Check operation of radios.
Perform antenna check.
Perform selcal operational check.
Perform operational check of passenger address system.
Functionally check audio integrating system.
Repair co-axial cable.
Troubleshoot faulty system.

ATA: 24 (Electrical power)
Charge lead/acid battery.
Charge ni-cad battery.
Check battery capacity.
Replace cells.
Deep cycle ni-cad battery.
Replace generator.
Replace switches.
Replace circuit breakers.
Adjust voltage regulator.
Amend electrical load analysis report.
Repair / replace electrical feeder cable.
Troubleshoot faulty system.

ATA: 25 (Equipment/furnishings)
Replace carpets.
Replace crew seats.
Replace passenger seats.
Check inertia reels.
Check seats/belts for security.
Check emergency equipment.
Check ELT for compliance with regulations
Repair toilet waste container.
Repair upholstery.
Change cabin configuration.

ATA: 26 (Fire protection)
Check fire bottle contents.
Check operation of warning system.
Check cabin fire extinguisher contents.
Check lavatory smoke detector system.
Install new fire bottle.
Replace fire bottle squib.
Troubleshoot faulty system.

ATA: 27 (Flight controls)
Replace horizontal stabilizer.
Replace elevator.
Replace aileron.
Replace rudder.
Replace trim tabs.
Install control cable and fittings.
Replace flaps.
Replace powered flying control unit.
Replace flap actuator.
Adjust trim tab.
Adjust control cable tension.
Check control range and sense of movement.
Check for correct assembly and locking.
Troubleshoot faulty system.

ATA: 28 (Fuel)
Replace booster pump.
Replace fuel selector.
Replace fuel tank cells.
Check filters.
Flow check system.
Check calibration of fuel quantity gauges.
Check operation feed/selectors.
Troubleshoot faulty system.

ATA: 29 (Hydraulics)
Replace engine driven pump.
Replace standby pump.
Replace accumulator.
Check operation of shut off valve.
Check filters.
Check indicating systems.
Perform functional checks.
Troubleshoot faulty system.

ATA: 30 (Ice and rain protection)
Replace fluid tank.
Replace pump.
Replace timer.
Replace distributor.
Install wiper motor.
Repair de-icing boot.
Adjust brush block.
Check operation of systems.
Troubleshoot faulty system.

ATA: 31 (Indicating/recording systems)
Replace flight data recorder.
Replace cockpit voice recorder.
Replace clock.
Replace panel vibrator.
Replace master caution unit.
Perform FDR calibration/correlation check.
Perform FDR data retrieval.
Troubleshoot faulty system.

ATA: 32 (Landing gear)
Build up wheel.
Replace main wheel.
Replace nose wheel.
Replace shimmy damper.
Rig nose wheel steering.
Replace shock strut seals.
Replace brake unit.
Replace brake control valve.
Bleed brakes.
Test anti skid unit.
Test gear retraction.
Change bungees.
Install floats.
Install skis.
Adjust micro switches.
Charge struts.
Troubleshoot faulty system.

ATA: 33 (Lights)
Repair*I*replace rotating beacon.
Repair/replace landing lights.
Repair*I*replace navigation lights.
Repair*I*replace interior lights.
Repair replace emergency lighting system.
Perform emergency lighting system checks.
Troubleshoot faulty system.

ATA: 34 (Navigation)
Calibrate magnetic direction indicator.
Replace airspeed indicator.
Replace altimeter.
Replace air data computer.
Replace VOR unit.
Replace ADI.
Replace HSI.
Check pitot static system for leaks.
Check operation of directional gym.
Functional check weather radar.
Functional check doppler.
Functional check TCAS.
Functional check DME.
Functional check ATC Transponder.
Functional check flight director system.
Functional check Inertial nav system.
Complete quadrantal error correction of ADF system.
Update flight management system data base.
Check calibration of altimeter system.
Check calibration of pressure altitude reporting system.
Troubleshoot faulty system.

ATA: 35 (Oxygen)
Inspect on board oxygen equipment.
Purge and recharge oxygen system.
Replace regulator.
Replace oxygen generator.
Test crew oxygen system.

Perform auto oxygen system deployment check.
Troubleshoot faulty system.

ATA: 36 (Pneumatic systems)
Replace filter.
Replace compressor.
Recharge dessicator.
Adjust regulator.
Check for leaks.
Troubleshoot faulty system.

ATA: 37 (Vacuum systems)
Replace vacuum pump.
Check/replace fillers.
Adjust regulator.
Troubleshoot faulty system.

ATA: 38 (Water*I*waste)
Replace water pump.
Replace faucet
Replace toilet pump.
Troubleshoot faulty system.

ATA: 45 (Central maintenance system)
Retrieve data from CMU.
Replace CMU.
Perform Bite check.
Troubleshoot faulty system.

ATA: 49 (Airborne auxiliary power)
Install APU.
Inspect hot section.
Troubleshoot faulty system.

ATA: 51 (Structures)
Sheet metal repair.
Composite repair.
Wooden repair.
Fabric repair.
Recover fabric control surface.
Treat corrosion.
Apply protective treatment.

Corrosion Control
Removal and treatment of aluminum alloy corrosion
Removal and treatment of steel alloy corrosion
Removal and treatment of magnesium alloy corrosion
Prepare metal surfaces by shot peening
Perform removal and treatment of galvanic corrosion

Corrosion Assessment
Perform inspection of aircraft structure for corrosion
Perform removal of affected corroded areas by chemical/mechanical methods
Perform measurement of corrosion damage
Perform test of metal composites for corrosion
Perform non-destructive testing (NDT) inspection and interpret results

Aircraft Drawings
Interpret information from blueprints

Sealing
Prepare metal/wood/composite surfaces for sealing
Select/mix and apply sealants to seams, joints and fasteners

Fastener Installation
Identify fasteners and prepare lay out pattern
Drill, ream and countersink holes.
Identify solid rivet types.
Perform heat treatment of rivets.
Perform rivet installation (set and buck).
Perform installation of special fasteners/swage threadless collars.
Perform installation of panel and cowl fasteners.
Perform installation of blind bolts/nuts/rivets/rivnuts.
Perform installation of threaded fasteners/self and non-self locking fasteners.
Remove and install heli-coil.

Structural Damage Assessment
Perform visual inspection of damaged area.
Interpret NDI results.
Draw sketch of damaged area and determine required repair.

Aircraft Structure and Designs
Remove, install and align wing assembly after repair.
Remove, repair, balance install and rig flight surfaces.
Perform a weld repair to tubular structure.
Perform sheet metal repair to monocoque/semi-monocoque fuselages.

Engine and Mounting
Perform a weld repair to an engine mount.

Metallurgy and Heat Treatment of Metals
Perform heat treatment of ferrous/non ferrous metals.
Perform hardness testing of ferrous/and non ferrous metals.

Assembly
Install and align parts using jigs/holding fixtures.
Install parts maintaining tolerances.
Install, trim and fit parts.
Perform drilling, reaming and countersinking of holes.
Removal, disassembly/re-assembly and installation of components and parts to gain access to a sheet metal repair.
Perform dressing and deburring of repaired area.
Application of corrosion protection.
Application of required sealants.
Perform bonding /spot weld parts.
Assemble parts using structural fasteners.
Remove/fabricate/install and safety flight control cables.
Remove old sealant and prepare and apply sealant to “wet wing” fuel tank, and pressure test tank for leaks.
Removal, repair and installation of wing leading edge/vertical/horizontal stabilizer surfaces after hail/bird strike damage.
Removal, prepare and install de-icing boots to wing leading edge/vertical/horizontal stabilizer surfaces.
Removal, prepare and install propeller de-icing boots.

Landing Gear
Repair main/nose landing gear doors
Repair to skis/floats

Sheet Metal Structures
Remove, repair/replace damage parts.
Reinforce/splice/replace structural sheet metal parts.
Reinforce/splice/replace forgings and extrusions.
Remove and replace rod-end fittings.
Repair non-structural cabin interior lining.
Perform stop drilling of small cracks in sheet metal parts.
Prepare and install patch to sheet metal skins.

Sheet Metal Fabrication
Read and interpret technical drawings.
Perform layout patterns/templates.
Perform cutting of material to size.
Form sheet metal with hand/machine tools.
Perform cold-working of fastener holes.
Perform sawing and routing of sheet metal.
Perform stop drilling of small cracks in sheet metal.
Perform fastening of sheet metal with rivets.
Perform fastening of sheet metal using bonding process.
Perform punch and drilling of sheet metal.
Perform dimpling and countersinking of sheet metal.

Composite Structures - Composite Repairs
Perform sanding/grinding/routing of damaged area.
Prepare damaged area by step/taper sanding.
Perform fabrication of pattern for cutting cloth patches.
Perform wetting-out of fabric with resin and cut out patches.
Perform a lay-up repair ply/plies using wet/pre-preg cloth.
Perform curing of repairs at room temperature.
Perform curing of repairs with heat blankets/oven.
Perform check for delamination.
Perform installation of inserts.
Perform sanding/priming and painting of repaired surface.

Composite Fabrication
Perform fabrication of master model.
Perform removal of mould from master model.
Perform fabrication of cutting pattern for lay-up plies.
Prepare plies for wet/pre-preg lay-up.
Prepare mould surface.
Perform curing of lay-up with heat blanket/oven/autoclave/room temperature.
Perform check for improper bonding.
Perform trimming of excess from parts/structure being fabricated.
Perform sanding/priming /painting of fabricated parts.

Fabric and Wood Repair
Perform fabric tests.
Perform repair to fabric covering.
Perform recovering of aircraft fabric surfaces.
Perform application of dope to aircraft fabric surfaces.
Perform application of paint to recovered fabric surfaces.

Wood Structures
Perform inspection of wood structures.
Perform selection of aircraft grade wood.
Perform repair/replacement to aircraft wood structure.
Perform sealing and refinishing to an aircraft wood structure.
Perform lamination of fabric to an aircraft wood structure.
Perform application of varnish to an aircraft wood structure.

Fluid lines and Conduits
Perform bending of tubing as per drawings/sample.
Perform fabrication of flexible hoses and leak test.
Perform fabrication of conduits and manifolds.

Windows
Perform inspection of aircraft windows
Remove and install cockpit windshield/sliding windows/side windows.
Perform buffing/polishing of windows.

ATA: 52 (Doors)
Rig*I*adjust locking mechanism.
Adjust air stair system.
Check operation of emergency exits.
Test door warning system.
Troubleshoot faulty system.

ATA: 56 (Windows)
Replace windshield.
Replace window.
Repair transparency.

ATA: 57 (Wings)
Skin repair.
Recover fabric wing.
Replace tip.
Replace rib.
Check incidence/rig.

ATA: 61 (Propeller)
Assemble prop after transportation.
Replace propeller.
Replace governor.
Adjust governor.
Perform static functional checks.
Check operation during ground run.
Check track.
Check setting of micro switches.
Dress out blade damage.
Dynamically balance prop.
Overhaul governor.
Overhaul prop.
Troubleshoot faulty system.

ATA 62: (Main rotors)
Install rotor assembly.
Replace blades.

Replace damper assembly.
Check track.
Check static balance.
Check dynamic balance.
Troubleshoot.

ATA: 63 (Rotor drive)
Replace mast.
Replace drive coupling.
Replace clutch/freewheel unit.
Replace drive belt.
Install main gearbox.
Overhaul main gearbox.
Check gearbox chip detectors.

ATA: 64 (Tail rotors)
Install rotor assembly.
Replace blades.
Troubleshoot.

ATA: 65 (Tail rotor drive)
Replace bevel gearbox.
Replace universal joints.
Overhaul bevel gearbox.
Install drive assembly.
Check chip detectors.

ATA: 67 (Rotorcraft flight controls)
Install swash plate.
Install mixing box.
Adjust pitch links.
Rig collective system.
Rig cyclic system.
Rig anti-torque system.
Check controls for assembly and locking.
Check controls for operation and sense.
Troubleshoot faulty system.

ATA: 71 (Power plant)
Build up ECU.
Replace engine.
Replace scat hose.
Repair cooling baffles.
Repair cowling.
Adjust cowl flaps.
Repair faulty wiring.
Troubleshoot.

ATA: 72 (Piston engines)
Remove/install reduction gear
Overhaul engine.
Top overhaul.
Check crankshaft run-out.
Check tappet clearance.
Check compression.
Extract broken stud.
Install helicoil
Perform ground run.
Establish/check reference RPM.
Troubleshoot.

ATA: 72 (Turbine engines)
Replace module.
Hot section inspection.
Engine ground run.
Establish reference power
Trend monitoring/gas path analysis.
Troubleshoot.

ATA: 73 (Fuel and control, piston)
Replace engine driven pump.
Adjust AMC.
Adjust ABC.
install carburetor/injector.
Adjust carburetor/injector.
Clean injector nozzles.
Replace primer line.
Check carburetor float setting.
Troubleshoot faulty system.

ATA: 73 (Fuel and control, turbine)
Replace FCU.
Replace engine driven pump.
Clean/test fuel nozzles.
Clean/replace fitters.
Adjust FCU.
Troubleshoot faulty system.

ATA: 74 (Ignition systems, piston)
Change magneto.
Change ignition vibrator.
Change plugs.
Test plugs.
Check H.T. leads.
Install new leads.
Check timing.
Check system bonding.
Troubleshoot faulty system.

ATA: 74 (Ignition systems, turbine)
Check glow plugs/ignitors.
Check H.T. leads
Check ignition unit.
Replace ignition unit.
Troubleshoot faulty system.

ATA: 76 (Engine controls)
Rig thrust lever.
Rig RPM control.
Rig mixture HP cock lever.
Rig power lever.
Check control sync (multi-eng).
Check controls for correct assembly and locking.
Check controls for range and sense of operation.
Adjust pedestal micro-switches.
Troubleshoot faulty system.

ATA: 77 (Engine indicating)
Replace engine instrument(s).
Replace oil temperature bulb.
Replace thermocouples.
Check calibration.
Troubleshoot faulty system.

ATA: 78 (Exhaust, piston)
Replace exhaust gasket.
Inspect welded repair.
Pressure check cabin heater muff.

Troubleshoot faulty system.

ATA: 78 (Exhaust, turbine)
Change jetpipe.
Change shroud assembly.
Install trimmers.

ATA: 79 (Oil)
Change oil.
Check filter(s).
Adjust pressure relief valve.
Replace oil tank.
Replace oil pump.
Replace oil cooler.
Replace firewall shut off valve.
Perform oil dilution.
Troubleshoot faulty system.

ATA: 80 (Starting)
Replace starter.
Replace start relay.
Replace start control valve.
Check cranking speed.
Troubleshoot faulty system.

ATA: 81 (Turbines, piston engines)
Replace PRT
Replace turbo-blower.
Replace heat shields.
Replace waste gate.
Adjust density controller.

ATA: 82 (Engine water injection)
Replace water/methanol pump.
Flow check water*I*meth system.
Adjust water *I* meth. control unit.
Check fluid for quality.
Troubleshoot faulty system.

ATA: 83 (Accessory gear boxes)
Replace gearbox
Replace drive shaft
Check chip detector.

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