



**Alabama**  
**Department of**  
**Postsecondary Education**

**Representing Alabama's Public Two-Year College System**

**AMT 105**  
**Materials and Processes**  
**Plan of Instruction**

**Effective Date: 2022**

**Version Number: Base Document**

**AMT 105 Materials and Processes    135 Hours    Theory 45    Laboratory 90**

**COURSE DESCRIPTION:** This course introduces aircraft hardware and materials, precision measuring and nondestructive testing, aircraft ground operations, fuels and cleaning and corrosion control methods, and the use of aircraft drawings. Emphasis is on identification and selection of aircraft hardware, performance of non-destructive testing, fabrication and inspection of flexible fluid lines, identification of fuels, use of cleaning materials, and corrosion control programs. Upon completion, students should be able to perform non-destructive tests, use precision measuring tools, fabricate and install rigid and flexible fluid lines, select hardware and fuels, and identify, read, create, and interpret aircraft drawings.

**This is a CORE course.**

**CONTACT/CREDIT HOURS** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Theory Contact/Credit Hours	3/3 hours	45 hours (1:1)
Lab Contact/Credit Hours	6/2 hours	90 hours (3:1)
Total Contact/Credit Hours	9/5 hours	135/5 hours

NOTE: Colleges may schedule lab hours as manipulative (3:1) or experimental (2:1). Adjustments in contact hours must be made accordingly.

**PREREQUISITE COURSES** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Determined by college unless stated otherwise

**CO-REQUISITE COURSES** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Determined by college unless stated otherwise

**INDUSTRY COMPETENCIES****AM.I.B. Aircraft Drawings**

- AM.I.B.K1 – K4 Ability to Demonstrate Knowledge of Aircraft Drawings in Aviation
- AM.I.B.R1 – R4 Ability to identify, assess, and mitigate risks associated with aircraft drawings in aviation
- AM.I.B.S1 – S6 Ability to perform maintenance using aircraft drawings in aviation

**AM.I.D Fluid Lines and Fittings**

- AM.I.D.K1 – R6 Ability to Demonstrate Knowledge of Fluid Lines and Fittings in Aviation
- AM.I.D.R1 – R7 Ability to identify, assess, and mitigate risks associated with aircraft fuel lines and fittings
- AM.I.D.S1 – R8 Ability to perform maintenance on aircraft Fluid Lines and Fittings

**AM.I.E Aircraft Materials, Hardware, and Processes**

- AM.I.E.K1 – K14 Ability to Demonstrate Knowledge of Aircraft Materials, Hardware and Processes
- AM.I.E.R1 – R4 Ability to identify, assess, and mitigate risks associated with aircraft Materials, Hardware and Processes
- AM.I.E.S1 – S14 Ability to perform maintenance using aircraft Materials, Hardware and Processes

**AM.I.K Inspection Concepts and Techniques**

- AM.I.K.K1 – K5 Ability to Demonstrate Knowledge of Aviation Inspection Concepts and Techniques
- AM.I.K.R1 – R5 Ability to identify, assess, and mitigate risks associated with aircraft Inspection Concepts and Techniques
- AM.I.K.S1 – S8 Ability to perform maintenance using aircraft Inspection Concepts and Techniques

**COURSE OBJECTIVES**

The cognitive objective of this course is for each student to comprehend foundational knowledge needed to perform stated entry-level industry competencies.

The performance objective of this course is for each student to apply foundational knowledge and risk management to problems and exercises encountered in class.

**COURSE CONTENT OUTLINE FAA AUTHORITY 147****Subject B. Aircraft Drawings**

- AM.I.B.K1 Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
- AM.I.B.K2 Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
- AM.I.B.K3 Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
- AM.I.B.K4 Terms used in conjunction with aircraft drawings, blueprints, or system schematics

- AM.I.B.R1 Interpretation of plus or minus tolerances as depicted on aircraft drawings.
- AM.I.B.R2 Specifications for design of alterations and repairs.
- AM.I.B.R3 Applicability of the drawing or schematic to the particular aircraft by model and serial number.
- AM.I.B.R4 Identification of the current version and applicability of drawing being used.
- AM.I.B.S2 Identify the meaning of lines and symbols used in an aircraft drawing.

**105 AM.I.B Practical 1 (Interpret Lines and Symbols)**

- AM.I.B.S1 Draw a sketch of a repair or alteration.

**105 AM.I.B Practical 2 (Sketch a Welded Tube Repair)**

- AM.I.B.S3 Interpret dimensions used in an aircraft drawing.
- AM.I.B.S4 Identify changes on an aircraft drawing.
- AM.I.B.S5 Determine material requirements from an aircraft drawing.

**105 AM.I.B Practical 3 (Interpret and Utilize Blueprint Information)**

- AM.I.B.S6 Interpret graphs and charts.

**105 AM.I.B Practical 4 (Extract Solutions From Various Nomograms)**

**AMT105 Exam 1**

**SUBJECT D Fluid Lines and Fittings**

- AM.I.D.K1 Tubing and hose materials, applications, sizes, and fittings.
- AM.I.D.K2 Rigid line or flexible hose material identification.
- AM.I.D.K3 Rigid line fabrication, installation, and inspection techniques/practices.
- AM.I.D.K4 Flexible hose fabrication, installation, and inspection techniques/practices.
- AM.I.D.K5 Importance of using a torque wrench when securing fluid hose and line fittings.
- AM.I.D.K6 Use of torque seal or similar witness techniques after installing critical fluid hose and line fittings.
- AM.I.D.R1 System configuration prior to and during maintenance.
- AM.I.D.R2 Use of required safety equipment.
- AM.I.D.R3 Hazardous fluids.
- AM.I.D.R4 High-pressure fluid systems.
- AM.I.D.R5 A twisted hose.
- AM.I.D.R6 A loosened fitting or a hose that has moved out of position.
- AM.I.D.R7 Use of tools while applying torque to a fluid line.
- AM.I.D.S5 Identify installation and security requirements for rigid lines and flexible hoses.
- AM.I.D.S6 Identify fluid lines, pneumatic lines, and fittings.

**105 AM.I.D Practical 1 (Demonstrate Knowledge of Fluid Line Practices)**

- AM.I.D.S1 Fabricate a rigid line with a flare and a bend.
- AM.I.D.S8 Fabricate a flareless-fitting-tube connection.

**105 AM.I.D Practical 2 (Fabricate Rigid Fluid Lines, Flared and Flareless)**

- AM.I.D.S7 Fabricate a flexible hose.

**105 AM.I.D Practical 3 (Assemble Aeroquip Style Hose Terminations)**

- AM.I.D.S2 Install an aircraft rigid line.
- AM.I.D.S3 Install an aircraft flexible hose.
- AM.I.D.S4 Perform a rigid line or flexible hose inspection.

**105 AM.I.D Practical 4 (Demonstrate Fluid Line Installation Procedures)**  
**AMT105 Exam 2****SUBJECT E Aircraft Materials, Hardware, and Processes**

- AM.I.E.K1 Materials commonly used in aircraft and their general application.
- AM.I.E.K2 Heat treatment and metal working processes.
- AM.I.E.K3 Forces placed on aircraft materials (e.g., tension, compression, torsion, bending, strain, and shear).
- AM.I.E.K4 Hardware commonly used in aircraft (e.g., bolts, nuts, screws, pins, washers, turnlock fasteners, cables, cable fittings, and rigid line couplings).
- AM.I.E.K5 Safety wire and safety clip requirements and techniques.
- AM.I.E.K6 Precision measurement tools, principles, and procedures.
- AM.I.E.K7 Soldering preparation, types of solder, and flux usage.
- AM.I.E.K8 Torqueing tools, principles, and procedures.
- AM.I.E.K9 Suitability and compatibility of materials and hardware used for maintenance.
- AM.I.E.K10 Relationship between torque and fastener preload.
- AM.I.E.K11 Identification markings on materials and hardware.
- AM.I.E.K12 Characteristics of acceptable welds.
- AM.I.E.K13 Characteristics of unacceptable welds.
- AM.I.E.K14 Procedures for weld repairs.
- AM.I.E.R1 Use of personal protective equipment (PPE).
- AM.I.E.R2 Improper torque.
- AM.I.E.R3 Used hardware or suspected unapproved parts (SUPS).
- AM.I.E.R4 Torqueing techniques on critical, highly-stressed fasteners.
- AM.I.E.S3 Inspect and check welds.

**105 AM.I.E Practical 1 (Demonstrate Knowledge of Weld Faults)**

- AM.I.E.S1 Install safety wire on nuts, bolts, and turnbuckles.
- AM.I.E.S2 Determine and properly torque aircraft hardware.
- AM.I.E.S4 Identify aircraft materials and hardware based on manufacturer's markings.
- AM.I.E.S5 Select and install aircraft bolts.
- AM.I.E.S6 Make precision measurements with an instrument that has a Vernier scale.
- AM.I.E.S7 Check the concentricity of a shaft.
- AM.I.E.S11 Identify rivets by physical characteristics.
- AM.I.E.S14 Check for proper calibration of a micrometer.

**105 AM.I.E Practical 2 (Identify Aviation Specific Hardware)****105 AM.I.E Practical 3 (Select, Install, and Torque Hardware)****105 AM.I.E Practical 4 (Perform Safety Wiring and Cotter Pin Practices)**

- AM.I.E.S8 Identify aircraft control cable components.
- AM.I.E.S9 Fabricate a cable assembly using a swaged-end fitting.

**105 AM.I.E Practical 5 (Perform Control Cable Swaging)**

- AM.I.E.S10 Select the correct aluminum alloy for a structural repair.
- AM.I.E.S12 Determine suitability of materials for aircraft repairs.
- AM.I.E.S13 Distinguish between heat-treated and non-heat-treated aluminum alloys.

**105 AM.I.E Practical 6 (Perform Material Sorting) ie UT-ET****AMT105 Exam 3**

**SUBJECT K Inspection Concepts and Techniques**

- AM.I.K.K1 Measuring tools, including calipers, micrometers, and gauges.
- AM.I.K.K2 Calibration and tool accuracy requirements.
- AM.I.K.K3 Nondestructive Testing (NDT) procedures and methods.
- AM.I.K.K4 Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections).
- AM.I.K.K5 Aircraft inspection methods and tools for materials, hardware, and processes.
- AM.I.K.R1 Demagnetizing a component following a magnetic particle inspection.
- AM.I.K.R2 Using precision measuring instruments.
- AM.I.K.R3 Calibration of precision measuring equipment.
- AM.I.K.R4 Selection of inspection techniques.
- AM.I.K.R5 Damage prevention to aircraft components and test equipment when using an ohmmeter.
- AM.I.K.S1 Use Vernier calipers.
- AM.I.K.S2 Use micrometers.
- AM.I.K.S3 Use measurement gauges.
- AM.I.K.S4 Perform a visual inspection.
- AM.I.K.S5 Perform a dye penetrant inspection.
- AM.I.K.S6 Inspect aircraft for compliance with an AD.
- AM.I.K.S7 Identify NDT methods for composite, surface metal, and subsurface metal defects.
- AM.I.K.S8 Perform a tap test on a composite component.

**105 AM.I.K Practical 1 (Identify Common Aviation Hand tools)**

**105 AM.I.K Practical 2 (Perform Precision Measuring)**

**105 AM.I.K Practical 3 (Perform a Magnetic Particle Inspection, MT)**

**105 AM.I.K Practical 4 (Perform a Visual Inspection, VT)**

**105 AM.I.K Practical 5 (Perform a Dye Penetrant Inspection, PT)**

**105 AM.I.K Practical 6 (Complete AD Search and Compliance Check)**

**105 AM.I.K Practical 7 (Perform Composite Ring Test)**

**AMT105 Exam 4**

**AMT105 Final Examination**