

AVIATION MAINTENANCE II

COURSE DESCRIPTION

Aviation Maintenance II continues the general aviation maintenance content begun in *Aviation Maintenance I*. The course prepares students for gainful employment or further study leading to Federal Aviation Administration (FAA) certification in Airframe and/or Powerplant certification. Course content includes sheet metal, aircraft wood and fabric, avionics, assembly and rigging of rotary wing aircraft, aircraft inspections and a review of all Federal Aviation Administration (FAA) Regulations that govern technicians.

It is strongly recommended that administration and guidance follow the scope and sequence and course recommendations as listed.

Recommended: Aviation Maintenance I, Algebra I; Physical Science or Principles of Technology I

Recommended Credits: 2

Recommended Grade Levels: 11th, 12th

Number of Competencies: 36

Note 1: Instructors of Aviation Maintenance must be certified as an Airframe and Powerplant Technician by the Federal Aviation Administration.

Note 2: A minimum of 200 hours must be dedicated to Aviation Maintenance II to meet minimum standards set by the Federal Aviation Administration (FAA).

- FAA regulations require a minimum of 400 contact hours in General Maintenance toward Airframe or Powerplant certification (to be met by *Aviation Maintenance I and II*).

Note 3: The following defines terms used in the Performance Standards and describes the level of proficiency at which items under each subject in each curriculum must be taught, as outlined.

(A) Definitions.

- (1) “inspect” means to examine by sight and touch.
- (2) “check” means to verify proper operations.
- (3) “troubleshoot” means to analyze and identify malfunctions.
- (4) “service” means to perform functions that assure continued operation.
- (5) “repair” means to correct a defective condition. Repair of an airframe or powerplant system includes component replacement and adjustment, but not component repair.
- (6) “overhaul” means to disassemble, inspect, repair as necessary, and check.

(B) Teaching levels.

(1) Level 1 requires the following:

- (i) knowledge of general principles, but no practical application
- (ii) no development of manipulative skill
- (iii) instruction by lecture, demonstration, and discussion

(2) Level 2 requires the following:

- (i) knowledge of general principles, and limited practical application
- (ii) development of sufficient manipulative skill to perform basic operations
- (iii) instruction by lecture, demonstration, discussion, and limited practical application

(3) Level 3 requires the following:

- (i) knowledge of general principles, and performance of a high degree of practical application
- (ii) development of sufficient manipulative skill to simulate return to service
- (iii) instruction by lecture, demonstration, discussion, and a high degree of practical application

(C) Teaching materials and equipment. The curriculum may be presented utilizing currently accepted educational materials and equipment, including, but not limited to: calculators, computers, and audio-visual equipment.

AVIATION MAINTENANCE II

STANDARDS

- 1.0** Students will perform safety examinations and maintain safety records.
- 2.0** Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.
- 3.0** Students will integrate reading, writing, math, and science skills and understand the impact of academic achievement in the workplace.
- 4.0** Student will demonstrate aircraft weight and balance skills.
- 5.0** Students will maintain aircraft fluid lines and fittings.
- 6.0** Students will demonstrate aircraft materials and processes skills.
- 7.0** Students will perform ground operations and cleaning and corrosion control procedures.
- 8.0** Students will apply Federal Aviation Regulations that govern certified Aircraft Technicians and use required maintenance forms, records, and relevant publications.

AVIATION MAINTENANCE II

STANDARD 1.0

Students will perform safety examinations and maintain safety records.

LEARNING EXPECTATIONS

The student will:

- 1.1 Demonstrate a positive attitude regarding safety practices and issues.
- 1.2 Use and inspect personal protective equipment.
- 1.3 Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment.
- 1.4 Demonstrate continuous awareness of potential hazards to self and others and respond appropriately.
- 1.5 Assume responsibilities under HazCom (Hazard Communication) regulations.
- 1.6 Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies to protect coworkers and bystanders from hazards.
- 1.7 Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
- 1.8 Demonstrate appropriate related safety procedures.
- 1.9 Pass with 100 % accuracy a written examination relating to safety issues
- 1.10 Pass with 100% accuracy a performance examination relating to safety.
- 1.11 Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

- 1.1A Is attentive during safety discussions.
- 1.1B Actively seeks information about safe procedures.
- 1.1C Responds positively to instruction, advice, and correction regarding safety issues.
- 1.1D Does not deliberately create or increase hazards, such as by horseplay, practical jokes, or creating distractions.
- 1.1E Reports to school or work physically ready to perform to professional standards, such as rested, or not impaired by medications, drugs, alcohol, etc.
- 1.2 Selects, inspects, and uses the correct personal protective equipment for the assigned task.
- 1.3A Inspects power tools for intact guards, shields, insulation, and other protective devices.
- 1.3B Inspects extension cords for the presence of a functional ground connection, prior to use.
- 1.3C Operates and maintains tools in accordance with manufacturer's instructions and as required by regulation or company policy.
- 1.4A Is observant of personnel and activities in the vicinity of the work area.
- 1.4B Warns nearby personnel, prior to starting potentially hazardous actions.
- 1.5A When asked to use a new hazardous material, retrieves MSDSs (material safety data

- sheets), and identifies the health hazards associated with the new material.
- 1.5B** Reports hazards found on the job site to the supervisor.
 - 1.6A** Erects shields, barriers, and signage to protect coworkers and bystanders prior to starting potentially hazardous tasks.
 - 1.6B** Provides and activates adequate ventilation equipment as required by the task.
 - 1.7A** Reports all injuries to self to the immediate supervisor.
 - 1.7B** Reports observed unguarded hazards to their immediate supervisor.
 - 1.8A** Complies with personal assignments regarding emergency assignments.
 - 1.9A** Passes with 100% accuracy a written examination relating specifically to content area.
 - 1.10A** Passes with 100% accuracy a performance examination relating specifically to welding tools, equipment and supplies.
 - 1.11A** Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Conduct a practice drill simulating a hazardous solvent spill in which an emergency action plan is to be implemented.
- Instruct a visitor to obviously approach the vicinity of a student conducting a hazardous activity and note the level of awareness demonstrated by the student.
- For a project requiring the use of ladders and/or scaffolding, note the proper placement and securing procedures followed by students.

INTEGRATION LINKAGES

Language Arts, Mathematics, Technical Algebra, Technical Geometry, Algebra, Geometry
English IV: Communication for Life, SkillsUSA Technical Championships, American Welding Society (AWS), Guide for Training and Qualification of Entry Level Welder, National Center for Construction Education Research (NCCER), Secretary's Commission on Achieving Necessary Skills (SCANS), Professional Development Program, SkillsUSA

AVIATION MAINTENANCE II

STANDARD 2.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

- 2.1** Cultivate positive leadership skills.
- 2.2** Participate in the student organization directly related to their program of study as an integral part of classroom instruction.
- 2.3** Assess situations, apply problem-solving techniques and decision-making skills within the school, community, and workplace.
- 2.4** Participate as a team member in a learning environment.
- 2.5** Respect the opinions, customs, and individual differences of others.
- 2.6** Build personal career development by identifying career interests, strengths, and opportunities.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 2.1A** Demonstrates character and leadership using creative-and critical-thinking skills.
- 2.1B** Uses creative thought process by “thinking outside the box.”
- 2.2A** Relates the creed, purposes, motto, and emblem of their student organization, directly related to personal and professional development.
- 2.2B** Plans and conducts meetings and other business according to accepted rules of parliamentary procedure.
- 2.3A** Makes decisions and assumes responsibilities.
- 2.3B** Analyzes a situation and uses the Professional Development Program or career technical student organization materials directly related to the student’s program of study to resolve it.
- 2.3C** Understands the importance of learning new information for both current and future problem solving and decision making.
- 2.4A** Organizes committees and participates in functions.
- 2.4B** Cooperates with peers to select and organize a community service project.
- 2.5A** Researches different customs and individual differences of others.
- 2.5B** Interacts respectfully with individuals of different cultures, gender, and backgrounds.
- 2.5C** Resolves conflicts and differences to maintain a smooth workflow and classroom environment.
- 2.6A** Creates personal career development by identifying career interests, strengths, and opportunities.
- 2.6B** Identifies opportunities for career development and certification requirements.

- 2.6C** Plans personal educational paths based on available courses and current career goals.
- 2.6D** Creates a resumé that reflects student’s skills, abilities, and interests.

SAMPLE PERFORMANCE TASKS

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various career technical student organizations’ programs and/or competitive events.
- Implement an annual program of work.
- Prepare a meeting agenda for a specific career technical student organization monthly meeting.
- Attend a professional organization meeting.
- Develop a program of study within their career opportunities.
- Participate in the American Spirit Award competition with SkillsUSA.
- Complete *Professional Development Program Level I and Level II*, SkillsUSA.

INTEGRATION LINKAGES

SkillsUSA, *Professional Development Program*; SkillsUSA; Communications and Writing Skills; Teambuilding Skills; Research; Language Arts; Sociology; Psychology; Math; Technical Math; English IV: Communication for Life; Social Studies; Problem Solving; Interpersonal Skills; Employability Skills; Critical-Thinking Skills; Secretary’s Commission on Achieving Necessary Skills (SCANS); Chamber of Commerce; Colleges; Universities; Technology Centers; Secretary’s Commission on Achieving Necessary Skills (SCANS)

AVIATION MAINTENANCE II

STANDARD 3.0

Students will integrate reading, writing, math, and science skills and understand the impact of academic achievement in the work place.

LEARNING EXPECTATIONS

The student will:

- 3.1 Assume responsibility for accomplishing classroom assignments and workplace goals within accepted time frames.
- 3.2 Develop advanced study skills.
- 3.3 Demonstrate and use written and verbal communication skills.
- 3.4 Read and understand technical documents such as regulations, manuals, reports, forms, graphs, charts, and tables.
- 3.5 Apply the foundations of mathematical principles such as algebra, geometry, and advanced math to solve problems.
- 3.6 Apply basic scientific principles and methods to solve problems and complete tasks.
- 3.7 Understand computer operations and related applications to input, store, retrieve, and output information as it relates to the course.
- 3.8 Research, recognize, and understand the interactions of the environment and *green* issues as they relate to the course work and to a global economy.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 3.1A Uses appropriate time management to achieve goals.
- 3.1B Arrives at school on time each day.
- 3.1C Completes assignments and meets deadlines.
- 3.2A Assesses current personal study skills.
- 3.2B Demonstrates advanced note-taking ability.
- 3.2C Formulates appropriate study strategies for given tasks.
- 3.3A Communicates ideas, information, and messages in a logical manner.
- 3.3B Fills out forms, reports, logs, and documents to comply with class and project requirements.
- 3.4A Reads and understands technical documents and uses industry jargon, acronyms, and terminology appropriately.
- 3.4B Recognizes the meaning of specialized words or phrases unique to the career and industry.
- 3.5A Utilizes computation in adding, subtracting, multiplying, and dividing of whole numbers, fractions, decimals, and percents.
- 3.5B Chooses the right mathematical method or formula to solve a problem.
- 3.5C Performs math operations accurately to complete classroom and lab tasks.
- 3.6A Understands scientific principles critical to the course.

- 3.6B** Applies scientific principles and technology to solve problems and complete tasks.
- 3.6C** Has knowledge of the scientific method (e.g., identifies the problem, collects information, forms opinions, and draws conclusions).
- 3.7A** Uses basic computer hardware (e.g., PCs, printers) and software to perform tasks as required for the course work.
- 3.7B** Understands capabilities of computers and common computer terminology (e.g., program, operating system).
- 3.7C** Applies the appropriate technical solution to complete tasks.
- 3.7D** Inputs data and information accurately for the course requirements.
- 3.8A** Researches and recognizes *green* trends in career area and industry.
- 3.8B** Examines current environmentally friendly trends.
- 3.8C** Applies sustainability practices by understanding processes that are non-polluting, conserving of energy and natural resources, and economically efficient.

SAMPLE PERFORMANCE TASKS

- Examine and compile different learning styles for portfolios.
- Create calendars containing all activities and obligations for one month. Discusses how to handle conflicting or competing obligations then complete daily and weekly plans showing tasks, priorities, and scheduling.
- Complete self-assessments of study habits.
- Compute precise and exact measurements.
- Explore study strategies for different subjects and tasks then analyze two homework assignments and select the best strategies for completing them.
- Create “life maps” showing necessary steps or “landmarks” along the path to personal, financial, educational, and career goals.
- Take notes during counselor classroom visits and work in small groups to create flow charts of the path options.
- List attitudes that lead to success then rate individually in these areas. Work together to suggest strategies for overcoming the weaknesses identified own and partners’ self-assessments then share with the class the strategies developed.
- Research the Internet and other technology to collect and analyze data concerning climate change.
- Keep a data file of alternative energy sources and the sources’ impact on the environment.
- Develop a recycling project at home or for the school environment.

INTEGRATION LINKAGES

SkillsUSA, *Professional Development Program*; SkillsUSA; Communications and Writing Skills; Teambuilding Skills; Research; Language Arts; Sociology; Psychology; Math; Technical Math; English IV: Communication for Life; Social Studies; Problem Solving; Interpersonal Skills; Employability Skills; Critical-Thinking Skills; Secretary’s Commission on Achieving Necessary Skills (SCANS); Chamber of Commerce; Colleges; Universities; Technology Centers; Secretary’s Commission on Achieving Necessary Skills (SCANS)

AVIATION MAINTENANCE II

STANDARD 4.0

Student will demonstrate aircraft weight and balance skills.

LEARNING EXPECTATIONS

The student will:

- 4.1** Analyze the importance of aircraft weight and balance.
- 4.2** Weigh aircraft using proper personal safety procedures.
- 4.3** Calculate and record weight and balance information.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET:

The student:

- 4.1A** Examines the role of weight in aircraft performance and safety.
- 4.1B** Examines the role of balance in aircraft performance and safety.
- 4.2A** Weighs an aircraft. (to proficiency level 2)
- 4.2B** Performs complete weight and balance check on an aircraft. (to proficiency level 3)
- 4.3A** Performs weight and balance calculations for an aircraft. (to proficiency level 3)
- 4.3B** Records weight and balance data for an aircraft. (to proficiency level 3)

SAMPLE PERFORMANCE TASKS

- Prepare aircraft for weighing, observing safety precautions.
- Compute moment, arms and empty weight center of gravity as well as forward and aft center of gravity limits for a specific aircraft.
- Complete weight and balance check and record data for a specific aircraft.

INTEGRATION LINKAGES

Language Arts, Science, Math, Math for Technology, Computer Skills, Research and Writing Skills, Communications Skills, Teamwork Skills, Leadership Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Federal Aviation Administration (FAA), PAMA (Professional Aviation Maintenance Association), ATEC (Aviation Technical Education Council), Tennessee Aeronautics Division.

AVIATION MAINTENANCE II

STANDARD 5.0

Students will maintain aircraft fluid lines and fittings.

LEARNING EXPECTATIONS

The student will:

- 5.1** Use appropriate tools for fluid line maintenance.
- 5.2** Manufacture and install rigid and flexible fluid lines and fittings.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET:

The student:

- 5.1A** Determines the appropriate tool for the task.
- 5.1B** Correctly and safely uses special fluid-line tools.
- 5.2A** Fabricates rigid and flexible fluid lines. (to proficiency level 3)
- 5.2B** Installs rigid and flexible fluid lines. (to proficiency level 3)

SAMPLE PERFORMANCE TASKS

- Fabricate and install a rigid line.
- Fabricate and install a flexible line.
- Demonstrate hand bending, single and double flaring, beading and filing.

INTEGRATION LINKAGES

Language Arts, Science, Math, Math for Technology, Electronics, Computer Skills, Research and Writing Skills, Communications Skills, Teamwork Skills, Leadership Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Federal Aviation Administration (FAA), PAMA (Professional Aviation Maintenance Association), ATEC (Aviation Technical Education Council), Tennessee Aeronautics Division, Occupational Safety and Health Administration (OSHA), Tennessee Occupational Safety and Health Administration (YOSHA), Environmental Protection Agency (EPA), SkillsUSA

AVIATION MAINTENANCE II

STANDARD 6.0

Students will demonstrate aircraft materials and processes skills.

LEARNING EXPECTATIONS

The student will:

- 6.1** Examine various aircraft covering materials, finishes, and wood structures.
- 6.2** Perform approved methods and procedures for care of materials, finishes, and wood structures.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET:

The student:

- 6.1A** Analyzes the properties and functions of materials used in aircraft.
- 6.1B** Distinguishes and selects aircraft hardware and materials. (to proficiency level 3)
- 6.2A** Selects appropriate nondestructive testing methods. (to proficiency level 1)
- 6.2B** Performs dye penetrant, eddy current, ultrasonic, and magnetic particle inspections. (to proficiency level 2)
- 6.2C** Performs basic heat-treating processes. (to proficiency level 1)
- 6.2D** Inspects and checks welds. (to proficiency level 3)
- 6.1E** Performs precision measurements. (to proficiency level 3)
- 6.1F** Performs safety wiring techniques.

SAMPLE PERFORMANCE TASKS

- Determine and perform the appropriate care for a specific aircraft material.
- Perform a magnetic particle inspection on an aircraft.

INTEGRATION LINKAGES

Language Arts, Science, Math, Math for Technology, Electronics, Computer Skills, Research and Writing Skills, Communications Skills, Teamwork Skills, Leadership Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Federal Aviation Administration (FAA), PAMA (Professional Aviation Maintenance Association), ATEC (Aviation Technical Education Council), Tennessee Aeronautics Division, Occupational Safety and Health Administration (OSHA), Tennessee Occupational Safety and Health Administration (YOSHA), Environmental Protection Agency (EPA), SkillsUSA

AVIATION MAINTENANCE II

STANDARD 7.0

Students will perform ground operations and cleaning and corrosion control procedures.

LEARNING EXPECTATIONS

The student will:

- 7.1** Perform ground operation and servicing.
- 7.2** Demonstrate proper procedures for aircraft cleaning and corrosion control.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET:

The student:

- 7.1A** Starts, ground operates, moves, services, and secures aircraft. (to proficiency level 2)
- 7.1B** Identifies typical ground operation hazards. (to proficiency level 2)
- 7.1C** Distinguishes and selects fuels. (to proficiency level 2)
- 7.2A** Distinguishes and selects cleaning materials. (to proficiency level 3)
- 7.2B** Inspects, identifies, removes, and treats aircraft corrosion. (to proficiency level 3)
- 7.2C** Performs aircraft cleaning. (to proficiency level 3)

SAMPLE PERFORMANCE TASKS

- Select the appropriate cleaning materials for a given task.
- Recognize and treat corrosion on an aircraft.

INTEGRATION LINKAGES

Language Arts, Science, Math, Math for Technology, Electronics, Computer Skills, Research and Writing Skills, Communications Skills, Teamwork Skills, Leadership Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Federal Aviation Administration (FAA), PAMA (Professional Aviation Maintenance Association), ATEC (Aviation Technical Education Council), Tennessee Aeronautics Division, Occupational Safety and Health Administration (OSHA), Tennessee Occupational Safety and Health Administration (YOSHA), Environmental Protection Agency (EPA), SkillsUSA

AVIATION MAINTENANCE II

STANDARD 8.0

Students will apply Federal Aviation Regulations that govern certified Aircraft Technicians and use required maintenance forms, records, and relevant publications.

LEARNING EXPECTATIONS

The student will:

- 8.1** Interpret Federal Aviation Administration (FAA) regulations affecting aircraft maintenance technicians.
- 8.2** Access and use aircraft manufacturers' publications and complete forms and records.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

- 8.1A** Accesses relevant Federal Aviation Administration (FAA) regulations.
- 8.1B** Interprets the exercise of mechanic privileges within prescribed limitations. (to proficiency level 3)
- 8.2A** Writes descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records. (to proficiency level 3)
- 8.2B** Completes required maintenance forms, records, and inspection reports. (to proficiency level 3)
- 8.2C** Reads, comprehends, and applies information contained in Federal Aviation Administration (FAA) and manufacturers' aircraft maintenance specifications, data sheets, manual, publications, and related Federal Aviation regulations, Airworthiness Directives, and Advisory material. (to proficiency level 3)
- 8.2D** Reads technical data. (to proficiency level 3)

SAMPLE PERFORMANCE TASKS

- Detail the issuance, duration, experience, and limitations of maintenance technician certificates.
- Select and use technical standard orders.
- Select the appropriate manual to locate information needed for a given task.

INTEGRATION LINKAGES

Language Arts, Science, Math, Math for Technology, Electronics, Computer Skills, Research and Writing Skills, Communications Skills, Teamwork Skills, Leadership Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Federal Aviation Administration (FAA), PAMA (Professional Aviation Maintenance Association), ATEC (Aviation Technical Education Council), Tennessee Aeronautics Division, Occupational Safety and Health Administration (OSHA), Tennessee Occupational Safety and Health Administration (YOSHA), Environmental Protection Agency (EPA), SkillsUSA

AVIATION MAINTENANCE II

SAMPLING OF AVAILABLE RESOURCES

- *14 CFR - Chapter I - Part 147*, Code of Federal Regulations
- *Aviation Maintenance Technician Series – General*, Aviation Supplies & Academics, April 2000
- *Aviation Mechanic Handbook*, Aviation Supplies & Academics, September 2001
- *Aviation Educational Multimedia Library*, Aviation Technician Education Council (ATEC), www.atec-amt.org