LAUSD UNIFIED Division of Adult and Career Education

Career Technical Education (CTE) Course Outline

Course Title:	Introduction to Aviation Mechanics
Course Number:	79-70-51
Date:	June 2024
Industry Sector:	Transportation
Pathway:	Systems Diagnostics, Service & Repair
CBEDS Title:	Aircraft Mechanics
CBEDS Code:	5653
Credits:	5

Hours:

Total
70

Course Description:

This competency-based course includes instruction in general subjects related to basic aviation maintenance to include an introduction, safety, aircraft drawings, weight and balance, fluid lines and fittings, metallic structures, flight controls, rotorcraft fundamentals, aircraft instrument systems, hydraulic and pneumatic systems, aircraft electrical systems, reciprocating engines, propellers, turbine engines, and employability skills and resume preparation. The competencies in this course are extracted from the FAA Title 14 CFR Part 147 Airman Certification Standards requirements, California High School Academic Content Standards, and the California Career Technical Education Model Curriculum Standards.

Prerequisites:	Enrollment requires a minimum 9.0 reading level as measured by the CASAS GOALS test and a minimum 9.0 math level as measured by the CASAS GOALS Test and the minimum age of 16.
NOTE:	For Perkins purposes this course has been designated as an **introductory** course. This course **cannot** be repeated once a student receives a Certificate of Completion.
A-G Approval	N/A
Methods of Instruction:	Lecture and discussion, multimedia presentations, visual aids, projects, individualized instruction.
Student Evaluation:	Summative: End of section assessments
Industry Certification:	N/A
Recommended Texts:	Crane, Dale and Michmerhuizen, Aviation Mechanic Handbook, 7th Edition, Aviation Supplies & Academics, 2017
Link to Resource Folder	N/A

Approved by: Renny L. Neyra, Executive Director

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
A. INTRODUCTION Understand, apply, and evaluate classroom and workplace policies and procedures. (2 hours)	1. Describe the scope and purpose of the course. 2. Describe the FAA requirements for attendance. 3. Describe the federal certification requirements. 4. Describe and explain classroom policies, grading, and procedures. 5. Discuss, identify, research, and draw conclusions on the different career paths, occupations, employment outlook, and career advancements in the transportation industry sector which have a role in aviation mechanics. 6. Describe the opportunities available for promoting gender equity and the representation of non-traditional populations. 7. Explain and recognize the importance of teamwork, respecting individual and cultural differences and diversity in the workplace.	**Career Ready Practice:** 1, 2, 3, 4, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Career Planning & Management: 3.4, 3.6, 3.9 Leadership & Teamwork: 9.6 Technical Knowledge & Skills: 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C4.2
B. SAFETY Understand safety procedures and techniques.	1. Explain the impact of Environmental Protection Agency (EPA) legislation on Transportation Industry Sector practices in protecting and preserving the environment. 2. Interpret OSHA-10 policies, procedures, and regulations for the workplace environment. 3. Describe and demonstrate the procedures for contacting proper authorities for the removal of hazardous materials based on the EPA standards.	**Career Ready Practice:** 1, 2, 4, 5, 10, 12 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5

(3 hours)	4. Describe the California Occupational Safety and Health Administration (Cal/OSHA) and its electrical safety standards governing aviation mechanics. 5. Describe the Safety Data Sheet (SDS) as it applies to the aviation industry. 6. Explain and demonstrate the standards regarding proper use of protective equipment. 7. Practice personal safety when lifting, bending, or moving equipment and supplies. 8. Identify classroom and workplace first aid and emergency procedures based on the American Red Cross (ARC) standards. 9. Describe school safety regulations. 10. Describe the safe use of shop equipment and storage areas. 11. Pass the safety test with 100% accuracy.	Technology: 4.2 Problem Solving & Critical Thinking: 5.1, 5.2. 5.4 Health & Safety: 6.1, 6.3, 6.4, 6.5, 6.6, 6.7 Technical Knowledge & Skills: 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C1.2, C1.4, C2.2, C4.2, C5.1, C5.2
C. AIRCRAFT DRAWINGS Demonstrate and understand the knowledge, risk management, and skills elements required for aircraft drawings.	1. The student demonstrates understanding and terminology of drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with the interpretation of tolerance as depicted on aircraft drawings as applied to specifications for alterations and repairs. 3. The student demonstrates the ability to draw a sketch of a repair or alteration and identify meanings of lines and symbols and dimensions used in an aircraft drawing.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2

(Refer to FAA-ACS Section: I, Subject B) (6 hours)		Demonstration & Application: 11.1 **CTE Pathway:** C2.4, C2.5, C2.6
D. WEIGHT AND BALANCE Demonstrate and understand the knowledge, risk management, and skills elements required for weight and balance. (Refer to FAA-ACS Section: I, Subject C) (6 hours)	1. The student demonstrates understanding and terminology of: a. weight and balance terminology and the purpose for weighing an aircraft b. weighing and determine procedures, including the general preparations for calculating Center of Gravity (CG) 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with aerodynamic and performance effects of weight and CG ranges in excess of limits. 3. The student demonstrates the ability to calculate a weight change and complete required records using reference materials.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.4, C2.5, C4.3
E. FLUID LINES AND FITTINGS Demonstrate and understand the knowledge, risk management, and skill	1. The student demonstrates understanding and terminology of rigid and flexible line fabrication, installation, and inspection techniques and practices. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with use of tools while applying torque to a fluid line.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0

elements required for fluid lines and fittings. (Refer to FAA-ACS Section: I, Subject D) (3 hours)	3. The student demonstrates the ability to fabricate and install rigid and flexible fluid lines with appropriate fluid line fittings using reference materials.	Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.2, C2.3, C4.3
F. METALLIC STRUCTURES Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft metallic structures.	1. The student demonstrates understanding and terminology of selection of rivets, hardware, and fasteners with respective layout, installation, and removal methods for a given sheet metal repair. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with utilizing maintenance safety practices/precautions and use of PPE when working with sheet metal structures, materials, tools, and equipment. 3. The student demonstrates the ability to design and draw a repair, including the number of rivets and size of sheet metal required to fabricate a corresponding part, in accordance with the respective technical data.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Health & Safety: 6.3, 6.4, 6.6 Technical Knowledge & Skills:

(Refer to FAA-ACS Section: II, Subject A) (6 hours)		10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.2, C2.7, C4.3
G. FLIGHT CONTROLS Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft flight controls. (Refer to FAA-ACS Section: II, Subject C) (6 hours)	1. The student demonstrates understanding and terminology of: a. aircraft primary flight controls and stabilizer rigging, balance, and flutter control systems b. secondary and auxiliary control services and other aerodynamic wing features 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with rigging aircraft flight controls using reference materials. 3. The student demonstrates the ability to: a. identify fixed-wing aircraft flight control surfaces, axis of movement and rigging adjustment locations b. fabricate a primary flight control cable	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.1, C2.2, C2.5, C4.3

H. ROTORCRAFT FUNDAMENTALS Demonstrate and understand the knowledge, risk management, and skill elements required for rotorcraft fundamentals. (Refer to FAA-ACS Section: II, Subject N) (3 hours)	1. The student demonstrates understanding and terminology of rotorcraft design, types, aerodynamics, flight controls, and operation of rotor systems using reference materials. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with working around helicopter blades during ground operations, ground-handling procedures, and functional tests. 3. The student demonstrates the ability to locate components of a helicopter rotor system.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.1, C2.2, C4.3
I. AIRCRAFT INSTRUMENT SYSTEMS Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft instrument systems.	1. The student demonstrates understanding and terminology of magnet compass inspection, operation, and swing procedures for direction indicating instruments to include safety measures. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with handling of mechanical gyros and performing maintenance on equipment identified as electro-static sensitive. 3. The student demonstrates the ability to inspect a magnetic compass and correct for deviation.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2

		Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Health & Safety: 6.2, 6.3, 6.6 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.1, C2.2, C2.3, C2.5, C5.1, C5.6, C7.1, C7.7
(Refer to FAA-ACS Section: II, Subject H) (3 hours)		
J. HYDRAULIC AND PNEUMATIC SYSTEMS Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft hydraulic and pneumatic systems.	1. The student demonstrates understanding and terminology of hydraulic system components, fluids, and operating principles. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with storage, handling, compatibility, and cross-contamination concerns with various types of hydraulic fluids and seals using safety measures and reference materials. 3. The student demonstrates the ability to identify, select, and diagnose appropriate hydraulic fluids for a given aircraft and locate respective servicing instructions.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.4 Health & Safety: 6.3, 6.4, 6.6 Technical Knowledge & Skills:

(Refer to FAA-ACS Section: II, Subject F) (6 hours)		10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C1.3, C2.2, C2.3, C2.5, C3.3, C3.7, C4.3, C8.1
K. AIRCRAFT ELECTRICAL SYSTEMS Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft electrical systems. (Refer to FAA-ACS Section: II, Subject K) (6 hours)	1. The student demonstrates understanding and terminology of: a. aircraft wiring sizes, types, selection, installation, and circuit protection devices, wiring shielding, and lighting protection b. soldering preparation, types of solder, flux usage, electrical connectors splices, terminals, and switches 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with selecting the size of wire in terminals for installation. 3. The student demonstrates the ability to perform wire terminations and splices, assemble a connector using solder, and secure wire bundles.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.1, 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.1, C2.2, C2.3, C2.5, C2.7, C3.4, C3.5, C3.6, C3.7,

		C4.1, C5.1, C7.1, C7.4, C7.7
L. RECIPROCATING ENGINES Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft reciprocating engines. (Refer to FAA-ACS Section: III, Subject A) (6 hours)	1. The student demonstrates understanding and terminology of reciprocating engine performance, maintenance, inspection, and ground operation. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with preparation for and ground operation of a reciprocating engine. 3. The student demonstrates the ability to operate and troubleshoot a reciprocating engine using reference materials.	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C3.1, C4.3, C5.6
M. PROPELLERS Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft propellers.	1. The student demonstrates understanding and terminology of types of propellers, blade design, and theory of operation. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with ground operation. 3. The student demonstrates the ability to locate and explain the procedures for balancing a fixed-pitched propeller and check blade static tracking.	**Career Ready Practice** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology:

(Refer to FAA-ACS Section: III, Subject M) (6 hours)		4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1 **CTE Pathway:** C2.2, C4.1, C5.6
N. TURBINE ENGINES Demonstrate and understand the knowledge, risk management, and skill elements required for aircraft turbine engines. (Refer to FAA-ACS Section: III, Subject B)	1. The student demonstrates understanding and terminology of turbine engine types, construction, internal components, and operating principles/theory of operation. 2. The student demonstrates the ability to identify, assess, and mitigate risk associated with performing maintenance on operation of a turbine engine using reference materials. 3. The student demonstrates the ability to identify and inspect various types of turbine engine compressors, inlet guide vanes, turbine fan blades and check for Foreign Object Damage (FOD).	**Career Ready Practice:** 1, 2, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2, 4.6 Problem Solving & Critical Thinking: 5.1, 5.4 Technical Knowledge & Skills: 10.1, 10.2 Demonstration & Application: 11.1

(3 hours)		**CTE Pathway:** C3.1, C4.3, C5.6
O. EMPLOYABILITY SKILLS & RESUME PREPARATION Understand, apply, and evaluate the employability skills and resume preparation required in aviation.	1. Understand and define employer requirements for soft skills such as: a. attitude toward work b. communication and collaboration c. critical thinking, problem solving, and decision-making d. customer service e. diversity in the workplace f. flexibility and adaptability g. interpersonal skills h. leadership and responsibility i. punctuality and attendance j. quality of work k. respect, cultural and diversity differences l. teamwork m. time management n. trust and ethical behavior o. work ethic 2. Develop a career plan that reflects career interests, pathways, and post-secondary options. 3. Create/revise a resume, cover letter and/or portfolio. 4. Demonstrate, analyze, research, and review the role of online job searching platforms and career websites to make informed decisions. 5. Demonstrate and complete and/or review an on-line job application. 6. Understand the importance of assessing social media account content for professionalism. 7. Understand and demonstrate interview skills to get the job: a. do's and don'ts for job interviews b. how to dress for the job 8. Demonstrate and create sample follow-up letters. 9. Understand the importance of the continuous upgrading of job skills as it relates to:	**Career Ready Practice:** 1, 2, 3, 4, 5, 7, 8, 9, 10, 11 **CTE Anchor:** Academics: 1.0 Communications: 2.2, 2.3, 2.4, 2.5 Career Planning & Management: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9 Technology: 4.1, 4.2, 4.3, 4.5 Problem Solving & Critical Thinking: 5.1, 5.4 Responsibility & Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics & Legal Responsibilities: 8.3, 8.4, 8.5 Leadership & Teamwork: 9.1, 9.2, 9.3, 9.4, 9.6, 9.7 Technical Knowledge & Skills: 10.1, 10.3 Demonstration & Application: 11.1, 11.2, 11.5

(5 hours)	a. certification, licensure, and/or renewal b. professional organizations/events c. industry associations and/or organized labor	**CTE Pathway:** C5.1, C5.4

ACKNOWLEDGEMENTS

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Ana Martinez and Daniel Perkins