



## COURSE OUTLINE: ASR111 - METALRGY & HEAT TREA

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ASR111: METALLURGY & HEAT TREATING PROCESSES
<b>Program Number: Name</b>	4067: AIRCRAFT STRUCT TECH
<b>Department:</b>	AIRCRAFT STRUCTURAL REPAIR
<b>Semesters/Terms:</b>	19W
<b>Course Description:</b>	Metallurgy is the study of metals, their properties and pertaining to aircraft - their structural applications. The student will also become familiar with the different heat treating processes used to improve these metals for aircraft structural use. Topics include ferrous and non-ferrous metals, heat treatment processes for aircraft steels and aluminum alloys and mechanical properties - hardness testing.
<b>Total Credits:</b>	2
<b>Hours/Week:</b>	2
<b>Total Hours:</b>	32
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4067 - AIRCRAFT STRUCT TECH</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	VLO 1 Safely use the tools, equipment and identify materials needed to carry out various sheet metal repairs.
	VLO 2 Demonstrate a working knowledge of the principles of aircraft design by applying theory and shop practice.
	VLO 7 Refer to specific aircraft manuals such as Aircraft Pocket Manual and Hardware Manual to determine safe and acceptable procedures and parts.
	VLO 13 Fabricate sheet metal parts with the use of shop equipment and manuals.
	VLO 16 Demonstrate honesty and integrity to match the requirements of the aircraft industry.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.
	EES 5 Use a variety of thinking skills to anticipate and solve problems.
	EES 6 Locate, select, organize, and document information using appropriate technology and information systems.
	EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.
	EES 10 Manage the use of time and other resources to complete projects.
	EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>Course Evaluation:</b>	Passing Grade: 70%, B
<b>Books and Required</b>	Aviation Mentenance Technician Handbook



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**Resources:**

ISBN: 978-1-56027-716-3

**Course Outcomes and Learning Objectives:**

<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>
1. Understand the heat-treating processes used to heat-treat ferrous and nonferrous metals and to discuss and identify all terminology used in each heat treating process.	1.1 describe how aluminum is produced 1.2 identify the major alloy in a sheet of aluminum by the part number stamped on the sheet 1.3 discuss various terms associated with the heat treatment process of aluminum 1.4 describe why we heat treat aluminum and the changes that occur in the metal 1.5 discuss the characteristics associated with magnesium 1.6 discuss heat treatment of ferrous metals and the various methods used in the heat treatment of ferrous metals 1.7 describe the purpose of having Alclad on aluminum 1.8 identify with the use of charts, the temperature that specific metals are heat treated at 1.9 describe, using charts, the precipitation heat treatment procedures to be used to heat treat aluminum 1.10 identify the soaking temperature of various alloyed metals 1.11 discuss heat treatment of 2024T3 rivets
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Discuss and identify various hardness testing methods performed on ferrous and non-ferrous metals.	2.1 identify the procedures used to operate both the Brinell and Rockwell hardness testers 2.2 describe how to identify the hardness of aluminum using the Barcol tester 2.3 discuss, using charts, the ultimate and shearing strength of various types of alloyed aluminum

**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>	<b>Course Outcome Assessed</b>
Assignments	10%	All
Test #24A	45%	1,2
Test #24B	45%	1,2

**Date:**

August 28, 2018

Please refer to the course outline addendum on the Learning Management System for further information.

