

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: GENERAL REPAIRS I
CODE NO. : ASR 104 **SEMESTER:** 1
PROGRAM: AIRCRAFT STRUCTURAL REPAIR
AUTHOR: STEVE LACHOWSKY
DATE: SEPT 05 **PREVIOUS OUTLINE DATED:** SEPT 04
APPROVED:

DEAN DATE
TOTAL CREDITS: 12
PREREQUISITE(S): N/A
HOURS/WEEK: 13.5 hrs/wk **Total 216 hours**

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**For additional information, please contact
School of Technology, Skilled Trades, Natural Resources & Business
(705) 759-2554, Ext. 2668**

I. COURSE DESCRIPTION:

Using established guidelines, textbooks and in-class presentations, students will complete solid shank rivet installations. Various rivet styles and sizes will be installed into sheetmetal of various thickness. Specific formulas will be used to complete layout on sheetmetal assignments. Installation of special fasteners will also be completed. The acceptable procedures for installing and removing of special fasteners will be demonstrated. Countersinking, dimpling and micro shaving operations will also be completed. The use of hand tools will be studied and safe operation techniques will be demonstrated. The proper maintenance of hand tools and shop equipment will be covered. Personal safety requirements will also be discussed. Practical projects will be assigned and must be completed.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

- 1) Identify the most common type of solid shank rivets used in the aircraft industry and the procedures to complete rivet layouts.

Potential Elements of the Performance:

- identify two most common types of rivets used
- discuss the various terms associated with rivet layout procedures such as pitch and edge distance
- discuss the minimum and maximum pitch for various rivet head styles
- describe using formulas, charts and structural repair manuals, the proper number of rivets to be used for a repair
- discuss factors affecting rivet layout results
- layout a basic sheetmetal repair given minimum information
- describe how to layout various rivet patterns for rectangular and circular repairs
- identify the equipment used to perform accurate layout repairs

- 2) Identify, install and removal of solid shank rivets using various hand tools. Inspection of acceptable and unacceptable rivet installation will be completed.

Potential Elements of the Performance:

- identify common solid shank rivets using codes and rivet head identification marks (i.e. AN470 AD-3-4 rivet)
- describe how to determine the proper length of rivet shank for a specific repair
- describe and requisition proper rivet sizes from stores for a repair

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE CONTINUED:

Potential Elements of the Performance Continued.....

- discuss how to operate various hand tools used to install solid shank rivets
- discuss how to install solid shank rivets properly
- identify a properly installed rivet
- describe various terms used in rivet installation such as “drawing” and skip riveting
- identify how to remove rivets properly using proper drill bit sizes and equipment
- identify the purpose of clecos and the various colours associated with cleco sizes
- discuss the advantages of using rivets instead of aircraft hardware
- determine proper bucking bar sizes and rivet gun sizes for a specific repair
- discuss proper maintenance of hand tools
- describe the purpose of using rivet squeezers and hole duplicator tools
- identify the purpose of deburring sheetmetal holes after drilling operations
- discuss how to protect aluminum from corrosion
- discuss the causes of poorly installed rivets
- determine which rivets require heat treating prior to installation
- identify areas where stainless steel rivets must be used

- 3) Complete specialized repairs and processes such as Countersinking, Dimpling, Micro-shaving and Straight Line Bend procedures.

Potential Elements of the Performance:

- describe two methods of countersinking aircraft sheetmetal
- determine which method should be used for a specific repair
- describe the types of CSK drill bits used for repair
- identify when the dimpling process should be used
- describe various ways of dimpling aircraft skins
- discuss both “Radius” and “Coin Dimpling” processes
- discuss micro-shaving process
- describe how to calculate straight bends on aircraft repairs
- identify terms such as “sight line, radius and nose readium bar” used in straight bend repairs
- identify the term “setback”
- identify the machinery used to roll metal and bend aluminum sheets
- describe how to use and adjust machinery for the purpose of performing straight bends or curved repairs
- identify machinery used to shear aluminum such as the manual and electric shears
- discuss the safety features and precautions of band saw operation

- fabricate both straight bend repairs and curved item repairs as per sample item
- complete basic micro showing operations as per instructor guidelines

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

- 4) Complete study of special fastener and blind rivet installation techniques and removal procedures

Potential Elements of the Performance:

- mechanical lock and friction lock rivet installation and removal procedures
- cherry max rivet installation and removal procedures
- huck bolt and lock bolt installation and removal procedures
- hi lok, hi lite and high shear fastener installation and removal procedures
- rivet installation and removal procedures
- anchor nut installation and removal procedures

III. TOPICS:

- 1) Sheetmetal layout and repairs
- 2) Solid Shank Rivet Identification & Installation Procedures
- 3) General Repairs and Processes
- 4) Special Fasteners & Blind Rivets
- 5) Straight Line Bending and Micro-Shaving

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

A/C 65-15A
A/C65-9A
EA-SM

V. EVALUATION PROCESS/GRADING SYSTEM

Multiple Choice Tests (5) accounting 75% towards final grade.

75% includes:

Solid Shank Rivet	25%
CSK, Dimpling & Layout	10%
General Repairs	15%
Special Fasteners	15%
Bend Allowance & Micro-shaving	10%

Practical Lab Assignments accounting for 25% towards final grade.

Note: Students in the Aircraft Structural Repair require a minimum of seventy (70) percent in a course to obtain a passing grade . This equates to a “B” grade.

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	4.00
B	70 – 79%	3.00
C	60 – 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program,

as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.