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. 09**	**PREVIOUS OUTLINE DATED:**	**Jan. 09**
APPROVED:	**"B. Punch"**		
	Chair		**DATE**
TOTAL CREDITS:	**14**		
PREREQUISITE(S):	**N/A**		
HOURS (Total):	**216**		

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 mico showing operations as per instructor guidelines

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 account for 25% toward final grade.
Note: The grade given for Project #21 (ASR102 student presentation – flight control systems) will be used as a lab assignment.

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.

Grade	Definition	Grade Point Equivalent
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:

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.

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.

Prior Learning Assessment**:**
Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

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

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

Communication:
The College considers ***WebCT/LMS*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the ***Learning Management System*** communication tool.

Plagiarism:
Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. 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.

Student Portal:
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to https://my.saultcollege.ca.

Electronic Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.
It is the departmental policy that once the classroom door has bee enclosed, the learning process has begun. Late arrivers will not be granted admission to the room.

COURSE NOTES:

1.} **All assignments must be completed. Failure to complete assignments will result in removal of 10% from the test associated with the assignment.**

2.} The prerequisite for ASR 128 is ASR 104. Successful completion of ASR 104 is a requirement.