



## COURSE OUTLINE: ASR124 - GENERAL REPAIRS I

Prepared: Devin York

Approved: Corey Meunier, Chair, Technology and Skilled Trades

|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code: Title</b>                                                                            | ASR124: GENERAL REPAIRS I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Program Number: Name</b>                                                                          | 4067: AIRCRAFT STRUCT TECH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Department:</b>                                                                                   | AIRCRAFT STRUCTURAL REPAIR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Semesters/Terms:</b>                                                                              | 19F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Course Description:</b>                                                                           | 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. |
| <b>Total Credits:</b>                                                                                | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hours/Week:</b>                                                                                   | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Total Hours:</b>                                                                                  | 216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Prerequisites:</b>                                                                                | There are no pre-requisites for this course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Corequisites:</b>                                                                                 | There are no co-requisites for this course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Substitutes:</b>                                                                                  | ASR104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>This course is a pre-requisite for:</b>                                                           | ASR128                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <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 3 Identify and order airframe parts with the use of Maintenance and Parts Manuals to complete necessary repairs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                      | VLO 4 Read and follow blueprint, shop drawings and manufacturer's manuals necessary in all manufacturing and overhaul facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                      | VLO 5 Organize work safely, economically and efficiently.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                      | VLO 6 Carry out any repair according to specifications, stated job procedures and the requirements of the Department of Transport Regulations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                      | VLO 7 Refer to specific aircraft manuals such as Aircraft Pocket Manual and Hardware Manual to determine safe and acceptable procedures and parts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                      | VLO 8 Demonstrate a sense of responsibility and appreciation of the high cost of the equipment and materials used to train the practical portion of this program.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



SAULT COLLEGE | 443 NORTHERN AVENUE | SAULT STE. MARIE, ON P6B 4J3, CANADA | 705-759-2554

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       | <p>VLO 9 Apply weight and balance formulas.</p> <p>VLO 10 Recognize basic hand tools and demonstrate their use for specific maintenance on floats, fuselage structures and control systems.</p> <p>VLO 12 Use specialized equipment such as reamers, taps and dies to complete a detailed repair as per manufacturer's specifications.</p> <p>VLO 13 Fabricate sheet metal parts with the use of shop equipment and manuals.</p> <p>VLO 15 Fabricate float and hull repairs using specialized equipment for float repairs.</p> <p>VLO 16 Demonstrate honesty and integrity to match the requirements of the aircraft industry.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Essential Employability Skills (EES) addressed in this course:</b> | <p>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.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 3 Execute mathematical operations accurately.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p> |
| <b>Course Evaluation:</b>                                             | Passing Grade: 70%, B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Other Course Evaluation &amp; Assessment Requirements:</b>         | <p>- Rewrite exams may be granted by the course instructor at the end of the semester. The rewrite exam may be a theory exam if the student fails only that portion of the course or a practical project if the student fails that portion of the course.</p> <p>-If the student fails both portions of the course he will have to rewrite a theory exam to cover the theory portion of the course and complete a practical project to complete the practical portion of the course.</p> <p>-The final theory exam is evaluated separately from the practical project. Each portion of the evaluation must attain a passing mark of 70%. The final grade will equate to a B grade.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Books and Required Resources:</b>                                  | <p>AVIATION MAINTENANCE TECHNICIAN by FEDERAL AVIATION<br/>ISBN: 9781560279501</p> <p>AVIATION MAINTENANCE TECHNICIAN by FEDERAL AVIATION<br/>ISBN: 8781560279525</p> <p>AVIATION MAINTENANCE TECHNICIAN by FEDERAL AVIATION<br/>ISBN: 9781619540255</p> <p>STANDARD AVIATION MAINTENANCE HANDBOOK by JEPPESEN<br/>ISBN: 9780884873242</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



**Course Outcomes and Learning Objectives:**

| <b>Course Outcome 1</b>                                                                                                                                            | <b>Learning Objectives for Course Outcome 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1.) Identify the most common type of solid shank rivets used in the aircraft industry and the procedures to complete rivet layouts.                               | 1.1 Identify two most common types of rivets used<br>1.2 Discuss the various terms associated with rivet layout procedures such as pitch and edge distance<br>1.3 Discuss the minimum and maximum pitch for various rivet head styles<br>1.4 Describe using formulas, charts and structural repair manuals, the proper number of rivets to be used for a repair<br>1.5 Discuss factors affecting rivet layout results<br>1.6 Layout a basic sheet metal repair given minimum information<br>1.7 Describe how to layout various rivet patterns for rectangular and circular repairs<br>1.8 Identify the equipment used to perform accurate layout repairs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Course Outcome 2</b>                                                                                                                                            | <b>Learning Objectives for Course Outcome 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| (2.) Identify, install and removal of solid shank rivets using various hand tools. Inspection of acceptable and unacceptable rivet installation will be completed. | 2.1 Identify common solid shank rivets using codes and rivet head identification marks (i.e. AN470 AD-3-4 rivet)<br>2.2 Describe how to determine the proper length of rivet shank for a specific repair<br>2.3 Describe and requisition proper rivet sizes from stores for a repair<br>2.4 Discuss how to operate various hand tools used to install solid shank rivets<br>2.5 Discuss how to install solid shank rivets properly<br>2.6 Identify a properly installed rivet<br>2.7 Describe various terms used in rivet installation such as drawing and skip riveting<br>2.8 Identify how to remove rivets properly using proper drill bit sizes and equipment<br>2.9 Identify the purpose of clecos and the various colours associated with cleco sizes<br>2.10 Discuss the advantages of using rivets instead of aircraft hardware<br>2.11 Determine proper bucking bar sizes and rivet gun sizes for a specific repair<br>2.12 Discuss proper maintenance of hand tools<br>2.13 Describe the purpose of using rivet squeezers and hole duplicator tools<br>2.14 Identify the purpose of de-burring sheet metal holes after drilling operations<br>2.15 Discuss how to protect aluminum from corrosion<br>2.16 Discuss the causes of poorly installed rivets<br>2.17 Determine which rivets require heat treating prior to installation<br>2.18 Identify areas where stainless steel rivets must be used |
| <b>Course Outcome 3</b>                                                                                                                                            | <b>Learning Objectives for Course Outcome 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| (3.) Complete specialized repairs and processes such                                                                                                               | 3.1 Describe two methods of countersinking aircraft sheet metal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



|                                               | as Countersinking, Dimpling, Micro-shaving and Straight Line Bend procedures.                                                                                                                                                                                                                                                        | 3.2 Determine which method should be used for a specific repair<br>3.3 Describe the types of CSK drill bits used for repair<br>3.4 Identify when the dimpling process should be used<br>3.5 Describe various ways of dimpling aircraft skins<br>3.6 Discuss both Radius' and Coin Dimpling processes<br>3.7 Discuss micro-shaving process<br>3.8 Describe how to calculate straight bends on aircraft repairs<br>3.9 Identify terms such as sight line, radius and nose radius bar used in straight bend repairs<br>3.10 Identify the term setback.<br>3.11 Identify the machinery used to roll metal and bend aluminum sheets<br>3.12 Describe how to use and adjust machinery for the purpose of performing straight bends or curved repairs<br>3.13 Identify machinery used to shear aluminum such as the manual and electric shears<br>3.14 Discuss the safety features and precautions of band saw operation<br>3.15 Fabricate both straight bend repairs and curved item repairs as per sample item<br>3.16 Complete basic micro shaving operations as per instructor guidelines |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|-------------------------------------|-----|----------|----|----------|----|----------|----|----------|----|---------|-----|
|                                               | <b>Course Outcome 4</b>                                                                                                                                                                                                                                                                                                              | <b>Learning Objectives for Course Outcome 4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | (4.) Complete study of special fastener and blind rivet installation techniques and removal procedures.                                                                                                                                                                                                                              | 4.1 Mechanical lock and friction lock rivet installation and removal procedures<br>4.2 Cherry max rivet installation and removal procedures<br>4.3 Huck bolt and lock bolt installation and removal procedures<br>4.4 Hi lok, hi lite and high shear fastener installation and removal procedures<br>4.5 Rivet installation and removal procedures<br>4.6 Anchor nut installation and removal procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
| <b>Evaluation Process and Grading System:</b> | <table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>PRACTICAL PROJECTS { average mark }</td><td>60%</td></tr><tr><td>TEST #10</td><td>5%</td></tr><tr><td>TEST #11</td><td>5%</td></tr><tr><td>TEST #12</td><td>5%</td></tr><tr><td>TEST #13</td><td>5%</td></tr><tr><td>TEST #9</td><td>20%</td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Evaluation Type | Evaluation Weight | PRACTICAL PROJECTS { average mark } | 60% | TEST #10 | 5% | TEST #11 | 5% | TEST #12 | 5% | TEST #13 | 5% | TEST #9 | 20% |
|                                               | Evaluation Type                                                                                                                                                                                                                                                                                                                      | Evaluation Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | PRACTICAL PROJECTS { average mark }                                                                                                                                                                                                                                                                                                  | 60%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | TEST #10                                                                                                                                                                                                                                                                                                                             | 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | TEST #11                                                                                                                                                                                                                                                                                                                             | 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | TEST #12                                                                                                                                                                                                                                                                                                                             | 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
|                                               | TEST #13                                                                                                                                                                                                                                                                                                                             | 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
| TEST #9                                       | 20%                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
| <b>Date:</b>                                  | August 29, 2019                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |
| <b>Addendum:</b>                              | Please refer to the course outline addendum on the Learning Management System for further information.                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                   |                                     |     |          |    |          |    |          |    |          |    |         |     |

