



# STARK STATE COLLEGE

## GENERAL SYLLABUS

### Course Information

**Course Name:** Rotary Unit Assembly  
**Course Number:** ARL232

### Required Materials

**Textbook(s):** Rotary Unit Assembly Handbook Ariel Corp  
**Required Readings:** None  
**Additional Materials:** Scientific Calculator, Laptops, Note Pads, Writing Utensils, Web Links, Handouts and related items as provided in class.

### Course Outline/Calendar

The date of coverage and order of coverage may be modified based on the faculty member and events beyond the control of faculty members that interfere with class times and teaching.

Week	Chapter/Topic/Lab
1: Shop Safety and Orientation	<ul style="list-style-type: none"> <li>• Topic: Introduction to industrial safety protocols, Personal Protective Equipment (PPE) requirements, and shop layout.</li> <li>• Lab: Tooling familiarization and basic hand tool operation.</li> </ul>
2: Blueprint Reading and Technical Documentation	<ul style="list-style-type: none"> <li>• Topic: Interpreting mechanical blueprints, schematics, and piping diagrams.</li> <li>• Lab: Reading and following assembly diagrams for a small mechanical sub-assembly.</li> </ul>
3: Principles and Rotary Compression	<ul style="list-style-type: none"> <li>• Topic: Theory of operation for rotary screw compressors, including thermodynamics and fluid dynamics.</li> <li>• Lab: Disassemble and reassemble a small-scale rotary unit to understand basic mechanics.</li> </ul>
4: Precision Measurement and Quality Assurance	<ul style="list-style-type: none"> <li>• Topic: Use of precision measuring tools (micrometers, calipers, torque wrenches) and introduction to Geometric Dimensioning and Tolerancing (GD&amp;T).</li> <li>• Lab: Practice precision measurements on sample parts and document findings.</li> </ul>
5: Compressor Components and Inspection	<ul style="list-style-type: none"> <li>• Topic: Detailed study of major rotary unit components, including rotors, bearings, seals, and housing.</li> <li>• Lab: Visual inspection of new and used compressor components for defects and wear.</li> </ul>

Week	Chapter/Topic/Lab
6: Shaft Preparation and Bearing Installation	<ul style="list-style-type: none"> <li>• Topic: Proper cleaning, inspection, and preparation of shafts for bearing installation. Procedures for heating and installing bearings.</li> <li>• Lab: Practice bearing installation and removal using standard industry techniques.</li> </ul>
7: Seal and Gasketing Installation	<ul style="list-style-type: none"> <li>• Topic: Understanding different types of seals (dry gas, labyrinth) and gaskets used in large compressors. Proper installation techniques.</li> <li>• Lab: Practical session on installing seals and gaskets in mock-up assemblies.</li> </ul>
8: Pre-Assembly Quality Check and Component Balancing	<ul style="list-style-type: none"> <li>• Topic: Review of all components and sub-assemblies before final integration. Introduction to vibration analysis and rotor balancing.</li> <li>• Lab: Perform a pre-assembly checklist and use basic balancing equipment on a test rotor.</li> </ul>
9: Casing and Rotor Assembly	<ul style="list-style-type: none"> <li>• Topic: Safety procedures for handling and moving large casing components. Installation of the rotor assembly into the compressor housing.</li> <li>• Lab: Guided hands-on assembly of a compressor casing and rotors.</li> </ul>
10: Drive -End And Gearbox Assembly	<ul style="list-style-type: none"> <li>• Topic: Integration of the drive motor and gearbox with the compressor unit. Understanding shaft alignment and coupling installation.</li> <li>• Lab: Alignment of the compressor unit with the drive system.</li> </ul>
11: Lubrication and Hydraulic Systems	<ul style="list-style-type: none"> <li>• Topic: Detailed study of the compressor's lubrication and hydraulic systems. Installation of oil pumps, filters, and piping.</li> <li>• Lab: Assemble and test the lubrication system on the course unit.</li> </ul>
12: Electrical and Control Systems	<ul style="list-style-type: none"> <li>• Topic: Overview of the electrical control panel, sensors, and wiring associated with the compressor unit.</li> <li>• Lab: Identify and install electrical connections and control components, with instructor supervision.</li> </ul>
13: System Testing and Quality Control	<ul style="list-style-type: none"> <li>• Topic: Procedures for pre-startup checks, pressure testing, and final quality inspections.</li> <li>• Lab: Participate in a system run-in and performance test for the assembled unit.</li> </ul>
14: Troubleshooting and Failure Analysis	<ul style="list-style-type: none"> <li>• Topic: Common causes of compressor failure and hands-on troubleshooting of common assembly errors.</li> <li>• Lab: Simulate and diagnose faults on a training unit.</li> </ul>
15: Maintenance and Preventive Measures	<ul style="list-style-type: none"> <li>• Topic: Best practices for scheduled maintenance, including oil changes, filter replacement, and system monitoring.</li> <li>• Lab: Practice basic maintenance procedures on the training unit.</li> </ul>
16 : Course Review and Final Examination	<ul style="list-style-type: none"> <li>• Topic: Comprehensive review of all course material.</li> <li>• Final Exam: Written and practical examination covering all aspects of large compressor rotary unit assembly</li> </ul>