



STARK STATE COLLEGE

GENERAL SYLLABUS

Course Information

Course Name: Large Line Unit Comp Assembly
Course Number: ARL239

Required Materials

Textbook(s): Large Line Unit Compressor Final 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: Safety, Introduction to Compressors, and Tools	<ul style="list-style-type: none"> ▪ Safety protocols: Personal Protective Equipment (PPE), Lockout/Tagout procedures, and job hazard analysis (JHA). ▪ Introduction to large compressors: Purpose, terminology, and operational theory. ▪ Component identification: Introduction to major compressor components, including casings, impellers, rotors, bearings, and seals. ▪ Tooling and equipment: Proper use and maintenance of hand tools, power tools, and specialized equipment used in assembly.
2: Blueprint and Technical Drawing Interpretation	<ul style="list-style-type: none"> ▪ Schematic and drawing fundamentals: Reading and understanding engineering drawings, including assembly prints, piping and instrumentation diagrams (P&IDs), and electrical schematics. ▪ Bill of Materials (BOM): How to cross-reference drawings with the BOM to ensure all parts are accounted for. ▪ Geometric Dimensioning and Tolerancing (GD&T): Interpreting precision requirements for mating parts.
3: Sub-Assemblies, Bearings, Seals, and Rotors	<ul style="list-style-type: none"> ▪ Bearings: Theory of journal and thrust bearings, preparation, installation, and inspection. ▪ Seals: Function and types of seals (e.g., dry gas seals), proper handling, and installation. ▪ Rotor assembly: Techniques for installing rotor components, such as impellers and balancing drums, with an emphasis on alignment.

Week	Chapter/Topic/Lab
4: Precision Measurement and Quality Control	<ul style="list-style-type: none"> ▪ Measurement tools: Proper use of micrometers, calipers, dial indicators, and other precision measuring instruments. ▪ Clearance checks: Performing and interpreting critical clearance measurements, such as bearing clearances and rotor runout. ▪ Documentation: Recording and reporting measurement data for quality assurance and traceability.
5: Casing and Diaphragm Bundle Installation	<ul style="list-style-type: none"> ▪ Casing preparation: Cleaning, inspection, and preparation of the compressor casing. ▪ Diaphragm bundle: Understanding the function of diaphragms and proper techniques for installation and alignment within the casing. ▪ Heads and covers: Safe and precise installation of the suction, discharge, and head covers.
6: Piping and Lubrication Systems	<ul style="list-style-type: none"> ▪ Piping installation: Assembling and fitting process piping, including intercoolers and oil lines. ▪ Lubrication system: Assembling, flushing, and preparing the force-feed lubrication system. ▪ Oil pressure control: Understanding and setting safety controls related to oil pressure.
7: Bolting and Torque Procedures	<ul style="list-style-type: none"> ▪ Bolting theory: Principles of bolted joints and understanding pre-load. ▪ Tightening techniques: Using hydraulic tensioners, torque wrenches, and other specialized bolting tools. ▪ Sequence and documentation: Following precise bolting patterns and documenting torque values for all critical fasteners.
8: Controls, Instrumentation, and Electrical	<ul style="list-style-type: none"> ▪ Control systems: Introduction to compressor control panels and operator interfaces. ▪ Instrumentation: Installing and connecting pressure transmitters, temperature sensors, and vibration probes. ▪ Electrical wiring: Introduction to low-voltage wiring for controls and instrumentation, following electrical schematics.
9: Pre-Startup Inspections	<ul style="list-style-type: none"> ▪ Final checks: A comprehensive review of the assembled unit before testing, including ensuring all tools are removed. ▪ Flushing and cleaning: Procedures for flushing lubrication and seal systems to remove contaminants. ▪ Leak testing: Conducting pressure decay and soap bubble tests on relevant components and piping.
10: Run-In and Performance Testing	<ul style="list-style-type: none"> ▪ Startup procedures: Following safe and detailed startup procedures for the compressor. ▪ Data collection: Monitoring vibration, pressure, temperature, and other performance metrics during testing. ▪ Troubleshooting: Identifying and addressing common issues that arise during initial startup.
11: Vibration Analysis and Balancing	<ul style="list-style-type: none"> ▪ Vibration theory: Understanding the causes and effects of vibration in rotating machinery. ▪ Vibration analysis: Using accelerometers and other equipment to measure and analyze vibration data. ▪ In-place balancing: Corrective actions to minimize vibration and ensure smooth operation.
12: Advanced Troubleshooting and Failure Analysis	<ul style="list-style-type: none"> ▪ Diagnostics: Advanced techniques for diagnosing mechanical and control system faults. ▪ Hands-on teardown: Disassembling failed compressors to analyze components and determine root causes. ▪ Preventive action: Developing strategies to prevent recurring failures.
13: On-the-Job Training (OJT) Integration	<ul style="list-style-type: none"> ▪ Working with a mentor: Trainees are paired with experienced assembly technicians for hands-on, real-world application.

Week	Chapter/Topic/Lab
	<ul style="list-style-type: none"> ▪ Active participation: Performing supervised assembly tasks on actual production units.
14: Comprehensive Project Assembly	<ul style="list-style-type: none"> ▪ Full unit assembly: Trainees assemble a large line unit compressor from start to finish under supervision. ▪ Peer review: Working in small teams to complete the assembly and review each other's work.
15: Review and Final Assessment	<ul style="list-style-type: none"> ▪ Written exam: A comprehensive written test covering all theoretical aspects of the course. ▪ Practical exam: A hands-on assessment where trainees demonstrate their ability to perform critical assembly tasks accurately and safely. ▪ Performance review: A final review with instructors and mentors to evaluate overall performance.
16: Certification and Program Closeout	<ul style="list-style-type: none"> ▪ Final Exam: Awarding course completion certificates to all successful trainees. ▪ Course wrap-up: Final Q&A session and course feedback from students.