

Course Outline for: VACT 1295 Rough Vacuum Operations**A. Course Description**

1. Number of credits: 1
2. Lecture hours per week: 1
3. Prerequisites: VACT 1294
4. Corequisites: None
5. MnTC Goals: None

Vacuum technology is the field whereby very low-pressure environments are created, maintained and analyzed, such as those needed in the fields of semiconductor manufacturing, glass coating and research. VACT 1295 covers topics needed to start work in a rough vacuum system including safety, troubleshooting and maintenance, processes conducted in vacuum systems, and the role of rough vacuum systems in high vacuum regimes.

B. Date last reviewed/updated: December 2022**C. Outline of Major Content Areas**

1. Safety considerations in vacuum technology and processes
2. Proper procedures and maintenance in vacuums.
3. Troubleshooting in the rough vacuum regime
 - a. Using pump-down curves to identify presence of contamination
 - b. Using rate-of-rise curves to identify leaks
4. Introduction to processes conducted under vacuum
 - a. Evaporation techniques
 - b. Materials characterization
5. Vacuum system design
6. The role of rough vacuum components in the high vacuum regime

D. Course Learning Outcomes

Upon successful completion of the course, the student will be able to:

1. Perform simple procedures in a rough vacuum system.
2. Design a rough vacuum system
3. Identify procedures to avoid contamination and outgassing in vacuum systems.
4. Interpret pump-down data as it applies to troubleshooting
5. Interpret rate-of-rise data as it applies to troubleshooting
6. Explain how thin films are created and analyzed.
7. Identify the parts of a high vacuum system where rough vacuum components are used.

E. Methods for Assessing Student Learning

Assessment methods may include, but are not limited to, the following:

1. Unit quizzes
2. A summative exam
3. Assessment of operation of rough vacuum equipment, in person or remote.
4. Assessments may include
 - a. Homework assignments
 - b. Discussions
 - c. Collaborative projects
 - d. Other quizzes

F. Special Information

This course is the last of a 3-part series that together constitute an Introduction to Rough Vacuum Technology.

Course instruction includes access to a rough vacuum equipment trainer system to support measurement and data collection exercises.