MINNESOTA WEST COMMUNITY & TECHNICAL COLLEGE
COURSE OUTLINE

Faculty is required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT.  RNEW                      COURSE NUMBER: 1180

NUMBER OF CREDITS:  3

COURSE TITLE:  Pneumatics

CATALOG DESCRIPTION:  This course provides learners with the foundational knowledge in pneumatics theory. The active learner will gain an understanding of the gas laws as they apply to pneumatic systems. The course material will identify and describe the various components used in pneumatics circuits and systems as well as describe the operations of these varying components within these systems.

AUDIENCE: This course is structured for students seeking a technical degree and for those requiring foundational knowledge about pneumatic systems.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area: by meeting the following competencies:
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PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:

LENGTH OF COURSE: 1 semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☐   fall X   spring ☐   summer ☐   undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are to:
   a. Provide students with theory and practice as it relates to fluid power systems
   b. Introduce students to the physical properties of gases and their relationship to energy through temperature and pressure and flow.
   c. Introduce students to system components and accessories, their functions, and performance expectations within pneumatic systems.
   d. Identify pneumatic maintenance and troubleshooting practices that are associated with pneumatic systems.
e. Identify various circuits and control using different pneumatic system components.

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Gaining a basic working knowledge about pneumatic systems and accessory system components.
   b. Applying the learned course materials in an academic and industrial setting
   c. Developing troubleshooting skills for pneumatic systems by demonstration with simulated software.

3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Interactive participation in on-line classroom discussion
   b. Written skills development will be reinforced through short-answer study guides, reports, and electronic communications

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Respectable participation in on-line classroom discussions

TOPICS TO BE COVERED:
1. Basic gas physics
2. Volume, absolute pressure, absolute temperature
3. Pneumatic systems
4. Compressing air, air flow, and Cfm ratings
5. Prime movers
6. Air compressor types
7. Receivers
8. Control Devices
9. Compressor control
10. Directional control valves
11. Flow control valves
12. Work devices
13. Pneumatic cylinders
14. Air motors
15. Vacuum cups
16. Pneumatic system contaminants
17. Solid contaminants
18. Liquid contaminants
19. Pneumatic filters
20. Intake filters
21. Inline filters
22. Pneumatic conditioning devices
23. Intercoolers
24. Moisture separators
25. Air dryers
26. Filter Regulated Lubricators (FRLs)
27. Compressed air preparation procedure  
28. Pneumatic symbols and schematics  
29. Basic, parallel, and series circuits  
30. Pneumatic system maintenance  
31. Troubleshooting pneumatic systems

LIST OF EXPECTED COURSE OUTCOMES:

Upon successful completion of this course, the student will

1. Understand the physical properties of a gas.  
2. Understand how fluid power systems use gas to transmit energy.  
3. Identify the advantages and disadvantages of using pneumatic systems.  
4. Identify the different types of air compressors and the different types of control valves used to control compressed air.  
5. Describe the different types of pneumatic cylinders.  
6. Describe the different types of air motors.  
7. Explain how the different types of vacuum cups are used.  
8. Describe the different types and effects of contaminants in pneumatic systems.  
9. Identify the different types of pneumatic filters and describe how they operate.  
10. Describe the different types of components in pneumatic conditioning devices.  
11. Describe the sequence of conditioning and preparing compressed air.  
12. Identify schematic symbols and their associated abbreviations that are used in fluid system diagrams.  
14. Design various circuits using different pneumatic components such as filters, control valves, accessory components, and monitoring devices.  
15. Maintain and troubleshoot pneumatic systems and components.

LEARNING/TEACHING TECHNIQUES used in the course are:

☐ Collaborative Learning  X  Problem Solving  
☐ Student Presentations  X  Interactive Lectures  
☐ Creative Projects  ☐  Individual Coaching  
X  Lecture  ☐  Films/Videos/Slides  
☐ Demonstrations  X  Other (describe below)  
☐ Lab  ☐ Computer simulation software

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

X  Reading  X  Tests  X  Individual Projects  
☐ Oral Presentations  X  Worksheets  ☐ Collaborative Projects  
X  Textbook Problems  ☐ Papers  ☐ Portfolio  
☐ Group Problems  ☐ Term Paper  
☐ Other (describe below)
EXPECTED STUDENT LEARNING OUTCOMES:

*All students will*

1. Describe the gas laws and be able to calculate temperature, pressure, and volume conversions.

2. Understand that a compressor, an aftercooler, and the pneumatic components they supply with compressed are vital to the operation of equipment for production manufacturing, material handling, assembly, and maintenance.

3. Understand that compressed air must be cleaned of contaminants, cooled to the proper temperature, regulated to the required pressure, and lubricated for proper lubrication of pneumatic system devices and components.

4. Demonstrate the proper use and application of pneumatic system components and accessory components.

5. Understand various circuits using different pneumatic components such as filters, control valves, accessory components, and monitoring devices.

6. Demonstrate his or her understanding of pneumatic system maintenance

7. Demonstrate his or her understanding of pneumatic system troubleshooting.

**Veteran Services:** Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

The information in this course outline is subject to revision

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or via your preferred Telecommunications Relay Service.

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