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. MECH                        COURSE NUMBER: 1120

NUMBER OF CREDITS:  3 credits (3 lect., 0 lab)

COURSE TITLE: Pneumatic Theory

CATALOG DESCRIPTION: Introduces the students to gas laws and principles, and pneumatic component identification, functions and applications.

AUDIENCE: Mechatronics and Energy Technical Specialist students.

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: semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☐    fall ☐    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:
   a. Address safety issues related to pneumatic systems
   b. Identify different components of a pneumatic system
   c. Describe how pneumatic principles work
   d. Explore pneumatic gas laws
   e. Apply calculations and equations to basic pneumatics
   f. Understand pneumatic symbols and schematic reading

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Completing homework (reading, reports, and worksheets)
   b. Participating in classroom discussions
   c. Taking open and closed book quizzes and tests
d. Performing internet research on basic pneumatics
e. Complete assigned calculations
f. Design a pneumatic system

3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Demonstrate both written and oral communication skills during presentations
   b. Interact and collaborate other students in assignments

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Help students recognize, understand and appreciate working in groups to solve problems

TOPICS TO BE COVERED:
1. Pneumatic applications
2. Pneumatic gas laws
3. Pneumatic symbols
4. Design pneumatic sequencing circuits
5. Pneumatic dcv operation
6. Cv factors
7. Proper plumbing practices for efficiency
8. Serial relay dcv applications
9. Regulator operation
10. Dual pressure circuit efficiency
11. Proportional regulator circuits
12. Flow control circuits
13. Quick exhaust valve uses
14. Shuttle valves
15. Relief valves
16. Cylinder & rodless cylinder applications
17. Air flow requirements
18. Air motor selection factors
19. Sizing air motors
20. Air/oil circuits
21. Hydraulic resistance circuits
22. Intensifier/booster circuits
23. Vacuum system applications
24. Compressors and compressor controls
25. Staging compressors
26. Storage receivers
27. Maintenance of compressors
28. Pneumatic filter operation
29. Lubricator operation
30. Operation of various dryers
31. Atmospheric and pressure dew points
32. Pneumatic distribution systems/circuits types
COURSE LEARNING OUTCOMES (GENERAL):

a. Address safety issues related to pneumatic systems
b. Identify different components of a pneumatic system
c. Describe how pneumatic principles work
d. Explore pneumatic gas laws
e. Apply calculations and equations to basic pneumatics
f. Understand symbols and schematic reading

STUDENT LEARNING OUTCOMES (SPECIFIC):

1. Identify pneumatic applications
2. Interpret pneumatic gas laws
3. Identify and interpret pneumatic symbols
4. Design pneumatic sequencing circuits
5. Describe pneumatic dcv operation
6. Identify Cv factors
7. Identify proper plumbing practices for efficiency
8. Describe serial relay dcv applications
9. Examine regulator operation
10. Examine dual pressure circuit efficiency
11. Diagnose proportional regulator circuits
12. Diagnose flow control circuits
13. Identify quick exhaust, shuttle, and relief valve applications
14. Identify cylinder & rodless cylinder applications
15. Calculate air flow requirements for various circuits
16. Determine air motor selection and sizing
17. Analyze air/oil circuits
18. Analyze hydraulic resistance circuits
19. Analyze intensifier/booster circuits
20. Identify vacuum system applications
21. Identify compressors and compressor controls
22. Define staging compressors
23. Define storage receivers
24. Identify compressor maintenance procedures
25. Define pneumatic filter operation
26. Define lubricator operation
27. Examine operation of various dryers
28. Analyze atmospheric and pressure dew points
29. Identify pneumatic distribution systems/circuits types

LEARNING/TEACHING TECHNIQUES used in the course are:

☑ Collaborative Learning ☑ Problem Solving
☑ Student Presentations ☑ Interactive Lectures
☑ Creative Projects ☑ Individual Coaching
☑ Lecture ☑ Films/Videos/Slides
☑ Demonstrations ☐ Other (describe below)
☐ Lab
ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

- Reading
- Tests
- Individual Projects
- Oral Presentations
- Worksheets
- Collaborative Projects
- Textbook Problems
- Papers
- Portfolio
- Group Problems
- Term Paper
- Other (describe below)

**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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Revised 10/1/16