

**MESABI RANGE COMMUNITY & TECHNICAL COLLEGE – VIRGINIA/EVELETH
COURSE OUTLINE**

Course Title: Pressure, Flow, and Level Instruments
Quarter Course Prefix and Number:
Semester Course Prefix and Number: EIAT 2267

Approval Date:
Revision Date:

Number of Credits: 3 **Number of Lecture Credits:** 1 **Number of Lab Credits:** 2
Semester(s) Offered: **Number of Studio/Discussion Credits:**

Course Purpose Code:

- 0 – Developmental Courses
- 1 – Non-Transferable General Studies
- 2 – Technical course related to career programs
- 3 – College course which has the primary goal of applying certain concepts (e.g. vocal ensemble)
- 4 - Other college course not considered a part of general education (MNTC) e.g. computer science, health, physical education
- 5 – Course which is intended to fulfill Minnesota Transfer Curriculum (MNTC) requirements.
- 9 – Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

Catalog Description:

This course is designed to encompass three related areas of industrial instrumentation measurement. The course covers the terminology, mathematical relationships, and physical properties involved with the measurement of pressure, level, and flow. The course provides the knowledge and skills required for operational understanding, proper installation, and accurate calibration of the primary elements and transducers used in these measurement areas.

Prerequisites and/or recommended entry skills/knowledge:

Course Prerequisite(s): EIAT 1253, EIAT 1233, EIAT 1243, EIAT 1295, & EIAT 1244
Reading Prerequisite:
Composition Prerequisite:
Mathematics Prerequisite:

Career Programs and Transfer Majors Accessing this Course:

Electrical & Industrial Automation Technology

Minnesota Transfer Curriculum Goal(s) partially met by this course if applicable: Notes: No more than two goals may be met by any one course. (Curriculum Committee review and the Vice President of Academic Affairs approval are required).

- | | |
|----------------------------------------------------------------------------|--------------------------------------------------------------|
| 0. <input checked="" type="checkbox"/> None | 6. <input type="checkbox"/> The Humanities and Fine Arts |
| 1. <input type="checkbox"/> Communications | 7. <input type="checkbox"/> Human Diversity |
| 2. <input type="checkbox"/> Critical Thinking | 8. <input type="checkbox"/> Global Perspectives |
| 3. <input type="checkbox"/> Natural Sciences | 9. <input type="checkbox"/> Ethical and Civic Responsibility |
| 4. <input type="checkbox"/> Mathematical/Logical Reasoning | 10. <input type="checkbox"/> People and the Environment |
| 5. <input type="checkbox"/> History and the Social and Behavioral Sciences | |

Learning outcomes, including any relevant competencies listed in the Minnesota Transfer Curriculum:

The student will:

1. exhibit professionalism
2. define terms related to physical properties associated with pressure measurement
3. compare units of measurement for pressure
4. define absolute and gage pressure
5. describe the effects of temperature and volume on pressure
6. distinguish differences in gas and liquid pressure measurement
7. describe pressure drop
8. describe the operation of manometers
9. describe the operation of potentiometer pressure transducers
10. describe three types of elastic element pressure instruments
11. describe capacitive, piezoelectric, variable inductance, and strain gage transducers
12. describe differential pressure cell operation
13. measure pressure utilizing pressure instruments
14. calibrate pressure transducers
15. describe sight glass level measurement
16. describe methods and devices used for point level measurement
17. describe methods and devices used for visual level measurement
18. describe variable displacement level measurement
19. describe install and calibrate a head pressure level system
20. describe install and calibrate an air bubbler or dip pipe level system
21. describe install and calibrate a capacitance probe level system
22. describe install and calibrate a ultra-sonic level system
23. describe basic properties of fluid flow
24. analyze displacement meters
25. analyze orifice plate, venturi, and elbow meters
26. analyze pitot tube, flow nozzle, and target meters
27. analyze variable area or rotameters
28. describe install and calibrate constriction type differential pressure meters
29. analyze magmeters
30. analyze turbine
31. analyze vortex
32. analyze ultrasonic and time of travel meters
33. describe install and calibrate velocity based flow meters
34. calculate velocity to volume conversions
35. describe open channel flow metering
36. analyze weir and flume flow measurements
37. describe mass flow meters

Possible student assessment methods:

Lab assignments, worksheets, papers, and tests.

Use of instructional technology (includes software, interactive video and other instructional technologies):

Power Point Software, videos, instrumentation lab facilities and equipment

A one-paragraph summary or outline of the major course content:

This course focuses on the practical application and operation of primary elements used in industrial instrumentation to measure pressure, level, and flow of liquids and gases. The course provides hands-on experience in the installation and calibration of measuring elements and their associated transmitters.

Additional special information (special fees, directives on hazardous materials, etc.)

Lab Fee

APPROVALS:

Body	Representative Signatures	Date
Curriculum Committee		
Faculty Association		
Meet and Confer		
Vice President of Academic Affairs		

Distribution: Original – Administrative Office, Library, Learning Center, Records, Student Services