**BARTON COMMUNITY COLLEGE**

**COURSE SYLLABUS**

# **GENERAL COURSE INFORMATION**

Course Number: MEAS 1101

Course Title: Gas Industry Concepts

Credit Hours: 5

Prerequisite: None

Division/Discipline: Workforce Training and Community Education/ Gas Measurement Program.

Course Description: This combination of instructor led and web based training introduces the student to the laws of fluid mechanics and gas measurement techniques commonly used in the industry.

# **INSTRUCTOR INFORMATION**

# **COLLEGE POLCIES**

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The college reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. (Most up-to-date documents are available on the College webpage.)

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at disabilityservices@bartonccc.edu.

# **COURSE AS VIEWED IN THE TOTAL CURRICULUM**

A basic understanding of fluid mechanics and concepts of natural gas flow measurement is fundamental to the custody transfer of natural gas between parties in addition to monitoring system gas usage and loss. The student must be able to understand these concepts in order to apply new skill sets at the required level.

# **ASSESSMENT OF STUDENT LEARNING**

Barton Community College assesses student learning at several levels:  institutional, program, degree and classroom.  The goal of these assessment activities is to improve student learning.  As a student in this course, you will participate in various assessment activities.  Results of these activities will be used to improve the content and delivery of Barton’s instructional program.

## Course Outcomes, Competencies, and Supplemental Competencies

1. List milestones in Fluid Mechanics history and applications.
2. Identify innovators and influential figures in fluid mechanics.
3. List relationships and similarities between aerodynamics, hydrodynamics, and pipeline fluid behavior.
4. Classify assumptions made during the analytical process.
5. Calculate flow using pressure differential measurements.
6. List and define the variables that affect the pressure differential calculations: specific gravity, density, atmospheric pressure.
7. Determine delta P with given fluid densities and pressures.
8. List and define the conservation laws.
9. Illustrate Newton’s Second Law of Motion.
10. Apply mathematics associated with Conservation of Momentum.
11. List the various forms of energy and explain how they apply to Conservation of Energy.
12. Define Conservation of Mass using examples of chemical reactions.
13. Apply mathematics associated with Conservation of Energy to given scenarios.
14. Define the Bernoulli Principle and list its applications.
15. Apply math to analyze the relationship between pressure, area, and velocity.
16. Calculate volumetric flow rate of an ideal fluid.
17. List the concepts of fluid flow.
18. Define and explain laminar flow and turbulent flow.
19. Classify the types of velocity profiles and list their causes.
20. Calculate Reynolds Number using momentum, diameter, and viscosity.
21. List natural gas physical properties
22. Specify the primary components commonly found in natural gas.
23. Classify basic differences between the elements and compounds found in natural gas.
24. Define the basic gas laws that pertain to natural gas and perform measurement calculations.
25. Apply Boyles’ Law, Charles’ Law, Avogadro’s Law and the Ideal Gas Law in natural gas flow measurement.
26. Perform calculations for pressure, temperature, and volume.
27. Define the three Rs in flow measurement: Repeatability, Reliability, and Range-ability.
28. Identify the categories of flow measurement devices.
29. Define the following devices: orifice, turbine, positive displacement, diaphragm, coriolis, vortex, and ultrasonic meters.
30. List uses for common flow conditioning devices.
31. Interpret Meter Station Drawings
32. Identify the various components of meter station drawings and related support drawings.
33. Navigate process diagrams.
34. **INSTRUCTOR'S EXPECTATIONS OF STUDENTS IN CLASS**
35. **TEXTBOOKS AND OTHER REQUIRED MATERIALS**
36. **REFERENCES**
37. **METHODS OF INSTRUCTION AND EVALUATION**
38. **ATTENDANCE REQUIREMENTS**

1. **COURSE OUTLINE**