

Pipefitting Technology II Lab

PEIMS Code: N1300428

Abbreviation: PIPETECL2

Grade Level(s): 11–12

Award of Credit: 1.0

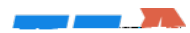
Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to [TAC §74.13](#) for guidance on endorsements.

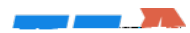
Course Description:

Students will learn about, be able to identify and install various types of piping systems and

- (D) create field sketches; and
 - (E) interpret drawing indexes and line lists.
- (4) The student demonstrates knowledge of installation methods for different types of valves and their storage and handling. The student is expected to:
- (A) identify valves that start and stop flow;
 - (B) identify valves that regulate flow;
 - (C) identify valves that relieve pressure;
 - (D) identify valves that regulate the direction of flow;
 - (E) identify valve actuators;
 - (F) explain how to properly store and handle valves;
 - (G) explain valve locations and positions;
 - (H) determine factors that influence valve selection; and
 - (I) interpret valve markings and nameplate information.
- (5) The student applies knowledge and skills in algebraic and geometric mathematics and measurements as they relate to the basic operations of pipefitters. The student is expected to:
- (A) demonstrate the use of measuring devices such as calculators, compasses, protractors, rulers, measuring tapes, transits, and levels;
 - (B) interpret tables of weights and measurements;
 - (C) calculate mathematical piping problems such as fitting take-offs (90 degree, 45 degree and odd angles), equal spread offsets, unequal spread offsets, and rolling offsets;
 - (D) troubleshoot pipefitting problems, including problems with pressure, force and mechanical advantage; and
 - (E) solve mathematical problems in related pipefitting scenarios, including area, volume, circumference, and right triangles using the Pythagorean Theorem.
- (6) The student describes the materials used in threaded piping systems. The student is expected to:
- (A) identify and explain the materials used in threaded piping systems;
 - (B) identify and explain pipe fittings;
 - (C) read screwed fitting joint drawings;
 - (D) identify and explain types of threads;
 - (E) estimate pipe lengths between joints;
 - (F) perform threading and assembling of piping and valves; and
 - (G) perform calculations for offsets.
- (7) The student describes the materials used in socket-weld piping systems. The student is expected to:
- (A) identify and explain types of socket weld piping materials;



- (B) identify and explain socket weld fittings;
 - (C) read socket weld piping drawings;
 - (D) estimate pipe lengths between socket weld fittings; and
 - (E) fabricate socket weld fitting to pipe.
- (8) The student demonstrates knowledge of butt-weld piping systems. The student is expected to:
- (A) identify butt weld piping materials and fittings;
 - (B) interpret butt weld piping drawings;
 - (C) prepare pipe ends for fit-up;
 - (D) estimate pipe lengths between fittings;
 - (E) select and install backing rings;
 - (F) explain how to use and care for welding clamps; and
 - (G) perform alignment procedures for various types of fittings.
- (9) The student demonstrates knowledge of shoring materials and systems per Occupational Safety and Health Administration (OSHA) standards. The student is expected to:
- (A) identify and explain the use of premanufactured support systems;
 - (B) demonstrate how to install a vertical shore used for shoring;
 - (C) determine the overall fall of a sewer line;
 - (D) determine and set the grade and elevation of a trench; and
 - (E) explain backfilling procedures.
- (10) The student describes pipe installation procedures and guidelines. The student is expected to:
- (A) identify and explain the types of underground piping materials, including the procedures for cast iron, ductile iron, concrete, carbon steel, fiberglass, and thermoplastic pipe;
 - (B) explain the size classifications of underground pipe;
 - (C) identify and explain the use of underground pipe fittings;
 - (D) explain the joining methods for underground pipe;
 - (E) describe the storage and handling methods of underground pipe;
 - (F) discuss underground pipe installation guidelines;
 - (G) demonstrate joining Chlorinated polyvinyl chloride (CPVC) and polyvinyl chloride (PVC);
 - (H) demonstrate joining ductile iron;
 - (I) list necessary precautions to be taken when working with materials or procedures to join pipes;
 - (J) measure pipe lengths manufactured from the various pipes materials, as required by a piping system layout;
 - (K) prepare the various pipe joints;



9. Identify valves that start and stop flow.
10. Identify valves that regulate flow.
11. Identify valves that relieve pressure.
12. Identify valves that regulate the direction of flow.
13. Identify valve actuators.
14. Given a select number of valves, match each valve to its given application.
15. Interpret valve markings and nameplate information.
16. Read and interpret screwed fitting joint drawings.
17. Determine pipe lengths between fittings, using the center-to-center method.
18. Determine pipe lengths between fittings, using the center-to-face method.
19. Determine pipe lengths between fittings, using the face-to-face method.
20. Given the length of travel of a 45-degree piping offset, calculate the length of the set.
21. Given the length of the set and the degree of the fittings, use the table of elbow constants to figure the travel and the run.
22. Calculate offsets, using the table of multipliers used to calculate offsets.
23. Calculate the travel of a rolling offset.
24. Thread pipe, using manual threaders.
25. Thread pipe, using a threading machine.
26. Apply pipe joint compound to the male threads of the pipe.
27. Make up the pipe and fittings.
28. Install a screwed valve.
29. Identify various socket weld fittings.
30. Interpret socket weld drawings.
31. Calculate pipe lengths from line drawings, using the center-to-center method.
32. Calculate pipe lengths from line drawings, using the center-to-face method.
33. Calculate pipe lengths from line drawings, using the face-to-face method.
34. Align a 90-degree elbow to the end of a pipe.
35. Square a pipe into a 90-degree elbow.
36. Align a flange to the end of a pipe.
37. Align a 45-degree elbow to the end of a pipe.
38. Align pipes joined by a coupling.
39. Install a valve.
40. Identify various butt weld fittings.
41. Interpret a butt weld drawing.
42. Clean a beveled pipe end, using a portable grinder.
43. Calculate pipe lengths from line drawings, using the center-to-center method.
44. Calculate pipe lengths from line drawings, using the center-to-face method.
45. Calculate pipe lengths from line drawings, using the face-to-face method.
46. Align straight pipe.
47. Align a pipe to a 45-degree elbow.
48. Align a pipe to a 90-degree elbow.
49. Square a pipe into a 90-degree elbow.
50. Align a pipe to a flange.
51. Align a pipe to a tee.



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52. Install a valve.
53. Identify and explain the types of underground piping materials.
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