

I. COURSE DESCRIPTION:

Theory element for Level one of the in-school portion of apprenticeship training for steamfitters.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. *Identify various types of piping materials and their use.***Potential Elements of the Performance:**

- know the difference between different types of copper tube and their correct use as required by the applicable regulatory authorities
- know the different types plastics and their correct use as required by the applicable regulatory authorities
- select steel pipe for application as dictated by its manufacturing method
- know various types of piping material and their application as required by code requirement or piping system component.

2. *Identify types of boilers and controls required for safe and proper operation.***Potential Elements of the Performance:**

- know the difference between a steam and hot water boiler
- know the different type of material that boilers are manufactured from
- know the difference between a fire tube and water tube boiler
- list the regulatory authorities which publish boiler codes or govern boilers
- define "package boiler"
- know the operational controls which are normally installed on hot water boilers for domestic or commercial and industrial use
- explain the operation of safety controls such as a low water cut-off

3. *Solve various trade related calculations using the required formulas and tables.***Potential Elements of the Performance:**

- select and apply the correct formula to calculate center to center measurements for 45° offsets and 45° rolling offsets.
- select and apply the correct formula to calculate the center to center measurements for 22.5° angles.
- select and apply the correct trigonometric ratio to calculate various angles, pipe lengths, angle of cut, cut back, degree of roll and length of arc required for layout of mitered fittings and piping offsets.
- select and apply the correct formula to calculate allowances required for bending of pipe or tubing.

- apply the correct tables or charts to obtain the end to end measurement which apply to various types of piping materials.
- perform calculations involving pressure, head and total force
- define the term British Thermal Unit (BTU)
- perform BTU calculations involving water and other materials
- convert Fahrenheit and centigrade scale readings

4. *Identify various types of heating system and methods of control.*

Potential Elements of the Performance:

- explain the difference between a gravity and forced hot water heating system
- list the various types of heating systems by piping arrangement or fittings
- know the difference between primary and secondary piping
- know the difference between parallel and series connections
- know the method of control used for constant or intermittent pump control
- know the use, location and operation of an aquastat or a thermostat

5. *Identify and select valves and pumps as required for specific applications.*

Potential Elements of the Performance:

- know the two basic classifications of pumps
- know the difference between a positive displacement and centrifugal pump
- know which type of pump is used as a circulator
- know the meaning of the term "head" and its importance in selecting pumps
- describe the primary function of a valve
- describe the ways in which valves control flow
- know which valves may be used for various applications based on valve design
- explain what the numbers and letters found on the valve bodies relate to
- know the various valve stem designs
- know the various abbreviations relating to valves

6. *Identify the properties of water*

Potential Elements of the Performance:

- know the three states of matter as they apply to water
- know the freezing and boiling points of water in Fahrenheit and Centigrade degrees at atmospheric pressure
- know the temperature at which water is most dense
- explain how the difference in density is affected by temperature and how it relates to a heating system
- know what minerals are found in hard water

- know the difference between temporary and permanent hardness

III. TOPICS:

1. Pipe materials
2. Boilers and controls
3. Trade related calculations
4. Types of heating systems and controls
5. Valves and pumps
6. Properties of water

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Level I Steamfitter textbook
 Scientific calculator
 IPT's Pipe Trades Handbook

V. EVALUATION PROCESS/GRADING SYSTEM:

The final grade for the course will be established from the average of seven possible weekly tests.

The following semester grades will be assigned to students:

Grade	Definition	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course	

without academic penalty.

VI. SPECIAL NOTES:

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

Particular attention to the attendance requirements during the introduction to the apprentices by the Training Consultant for the Ministry of Training, Colleges and Universities must be adhered to for successful completion of the course.