SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Plumbing I		
CODE NO. :	HMI113	**SEMESTER:**	TWO
PROGRAM:	Home Inspection Technician		
AUTHOR:	Mike King		
INSTRUCTOR:	Dave Smith		
DATE:	January 2015	**PREVIOUS OUTLINE DATED:**	January 2014

APPROVED:

"Corey Meunier"

CHAIR

TOTAL CREDITS:	THREE
PREREQUISITE(S):	None
HOURS/WEEK:	THREE

For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
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I. COURSE DESCRIPTION:

This is an introductory plumbing course that includes both theory and practical exercises. Topics covered include codes and regulations, pipe materials, drainage systems, waste pipe systems and venting systems. The goal of the course is to help the student understand residential plumbing codes, requirements and installations to facilitate effective defect recognition during the home inspection process.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Safe practices - Use personal protective equipment.

Potential Elements of the Performance:

- Select proper safety work boots, eye protection, clothing and gloves.
- Other elements will include ladder safety and fall arrest training

2. Interpret and apply the Ontario Building Code Part 7.

Potential Elements of the Performance:

- Discuss the organization of the Ontario Building Code
- Perform a Part 7 code review for a given set of building drawings
- Utilize the code appendices applicable to Part 7
- Identify CAHPI standards and describe their application to plumbing

3. Use hand and power tools.

Potential Elements of the Performance:

Safe and correct use of the following:

- Hammers, chisels, tubing cutters, wrap-a-rounds, files, soldering equipment, threading equipment and oxygen/acetylene equipment.
- Power threading machines, roll groover, bending machines, drills, saws, power actuated tools

4. Identify, select and use a variety of piping materials.

Potential Elements of the Performance:

- Identify and select as required:
  - copper tube and fittings, malleable iron fittings, steel pipe, steel tube, cast iron fittings, thermal plastics
  - 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
  - Know various types of piping material and their application as required by code requirement or piping system component.

5. Follow written or oral instructions necessary to perform the required elements to complete the required elements to complete assigned practical tasks.

Potential Elements of the Performance:

- Read and understand sketches provided.
  - use required formulas to calculate overall measurements
  - read and apply charts to obtain the correct pipe lengths
  - layout pipe for cutting with:
    - Pipe cutters
    - Tubing cutters
    - Power machines
    - lay out pipe and/or tubing for bending applications

***6.* Properly design and size drain plans and elevation drawings**

Potential Elements of the Performance:

- Select the proper pencils and set squares to clearly and neatly complete drain plans and stack elevations correctly.
- Follow oral and written instructions when completing drawings.
- Correctly size drains and vents as required by Part Seven of the Ontario Building Code.

***7.* 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 45º offsets and 45º rolling offsets.
- Select and apply the correct formula to calculate the center to center measurements for 22.5º angles.
- 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 measurements which apply to various types of piping materials

***8.* Identify and use the requirements of Part Seven of the Ontario Building Code pertaining to drainage systems.**

Potential Elements of the Performance:

- Select and apply the correct section, sub-section, clause, sentence or table as required to properly design and size plumbing drainage systems

***9.* Identify and use the requirements of Part Seven of the Ontario Building Code pertaining to venting systems.**

Potential Elements of the Performance:

- Select and apply the correct section, sub-section, clause, sentence or table as required to properly design and size plumbing venting systems.

10. Use a variety of methods required to join pipe and fittings in order to complete a specified practical assignment.

Potential Elements of the Performance:

Join piping by one or all of the following:

- Fusion welding
- Flared fittings
- Compression fittings
- Soft solder
- Hard solder
- Rolled groove

III. TOPICS:

1. *Protect yourself and others*
2. *Safe and proper use of hand tools, power tools, oxygen/acetylene cutting, welding torches and soldering equipment*
3. *Pipe and fitting materials: such as, but not limited to copper, steel, cast iron and thermo plastics*
4. *Calculations required for offsets, fitting allowance, thread engagement, fitting fabrication, pipe and tube bending*
5. *Testing systems and confirming test results*
6. *Ontario Building Code Part 7*
7. *Drain plans and stack elevations*
8. *45 degree offsets, latent and sensible heat, btu. calculations and temperature scale conversion*
9. *Combined drains, semi combined drains, sizing drains*
10. *Back vent, continuous waste and vent, dual vent, stack vent, wet vent, and vent stacks*

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Handouts as supplied by instructor
- Basic Plumbing Manual Level I (available in bookstore)
- Building Code book
- Scientific calculator
- Participation in HMI113 requires the use of safety boots and safety glasses at all times during lab hours (2), gloves and coveralls (no polyester materials) when needed - these items are not supplied by Sault College
- IPT handbook for piping (suggested only as a resource material available in the campus book store)
- Tools as supplied by the college

V. EVALUATION PROCESS/GRADING SYSTEM:

Student's evaluation is based on quizzes, written tests, specific practical assignments, attendance, and safety during the shop classes.

Written tests / quizzes	35%
Specific practical assignments	40%
Attendance	15%
Shop safety	10%

The following semester grades will be assigned to students:

Grade	Definition	*Grade Point Equivalent*
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:

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.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.

HMI113 - Plumbing I (Course Plan)

Week	Outcomes	Format	Hours	Topic/Content	Readings	Assignments	Assessment	Resources
1	1, 2	Lecture	1	***Use of personal protective equipment***	Instructor handout	Handout	Quiz	Plumbing manual I for all weeks
				Identify Assess hazardous conditions Recognize codes, acts and regulations				Code book
				Describe Compulsory trades as per regulations for plumbers				
	1, 3	Lab	2	Perform / Demonstrate Introduction to shop safety Intro to operation and storage of tools			Observation	Standard tool collection
2	1	Lecture	3+	***Ladder / Fall arrest training***			Test included	Pre-arranged
3	2	Lecture	3	***Codes, regulations and standards*** Explain Codes pertaining to plumbing	Code book	Handout	Quiz on codes	Code book, regulations and standards
				Identify Regulations and standards				

Week	Outcomes	Format	Hours	Topic/Content	Readings	Assignments	Assessment	Resources
4	4	Lecture Lab	1 2	***Pipe and fitting materials, pipe supports and hangers***	Handout	Handout	Quiz	Various pipes and fittings
				<u>Identify</u> Steel pipe and fittings Cast iron soil pipe and fittings ABS, PVC, cross-linked polyethylene, copper, PEX, composite pipe (plastic, aluminum/plastic), pipes and fittings Pipe supports and hangers				
				<u>Explain / Demonstrate</u> Joining dissimilar materials – proper transition fittings				
5	2, 4	Lecture	3	***Review / test #1***			Test # 1	
6, 7	4, 5, 7	Lecture	2	***Tools and piping methods***	Handout	handout	Performance accuracy	Various pipes and fittings
				<u>Identify</u> Measuring tools and instruments Various plumbing hand / power tools				
	4, 5, 10	Lab	4	<u>Apply</u>				
				Steel pipe, cast iron, copper, poly-metric plastics (PVC, ABS, CPVC), cutting and joining methods			Pipe joining and cutting observation	
				<u>Perform</u> Build piping projects incorporating different offsets			Major project assignment	

Week	Outcomes	Format	Hours	Topic/Content	Readings	Assignments	Assessment	Resources
8, 9	5, 7	Lecture	2	***Trade calculations-level 1***	Handout	Handout		Various pipes and fittings
		Lab	3	Apply Basic math, Linear measurements Conversion from Imp. to US values			Quiz	Plumbing manual I section 3
				Identify /Perform Calculation of various offsets and square roots				
				Perform Various piping arrangements (offsets) – select and apply formulae			Offset joining accuracy	
	2, 7	Lecture	1	***Review / test #2***			Test # 2	
10,11	6	Lecture	2	***Trade documentation –level 1***	Handout	Handout	Quiz	Computers and drafting tables
				Identify Read and interpret prints Various drafting instruments Various projection drawings Construction drawings				plumbing schematics
		Lab	4	Apply Draw various projection drawings, construction drawings			Drawings will be marked	
12	6, 8	Lecture	1	***Drainage systems - introduction***	Handout		Quiz	
		Lab	2	Apply Sizing drainage systems and project work			Major project	Various pipes and fittings

Week	Outcomes	Format	Hours	Topic/Content	Readings	Assignments	Assessment	Resources
13	6, 9	Lecture	3	***Venting Systems - introduction***	Handout		Quiz	
				Apply Sizing venting systems and project work			Major project	Various pipes and fittings
14	10	Lecture	1	***Joining methods***				
		Lab	2	Demonstrate Oxy-acetylene cutting and welding equipment and accessories Apply Lay down beads, prepare, tack / weld a butt joint (saddle connection on a drain)			Observation	Various pipes and fittings
15	6, 7, 8, 9	Lecture	3	***Review / test #3***			Test # 3	
16	All	Lecture	3	***Final Review***				