

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: Plumbing II

CODE NO. : HMI201 **SEMESTER:** THREE

PROGRAM: Home Inspection Technician

AUTHOR: Roman Peredun
INSTRUCTOR: David Smith

DATE: September 2014 **PREVIOUS OUTLINE DATED:** September 2013

APPROVED:

"Corey Meunier"
CHAIR

TOTAL CREDITS: THREE

PREREQUISITE(S): HMI113 – Plumbing I

HOURS/WEEK: THREE

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I. COURSE DESCRIPTION:

HMI201 is a continuation of Plumbing I (HMI113). Topics addressed include water distribution systems, residential plumbing fixtures and systems, and include the installation of drains, vents, basic fixture installations, water distribution piping and testing of the various systems. The goal of this course is to help the student understand drains, vents, fixtures, as well as water distribution piping 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. Use personal protective equipment.Potential Elements of the Performance:

- Select proper safety work boots, eye protection, clothing and gloves.

2. 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.
- Safe and correct use of the following: power threaders, roll groover, bending machines, drills, saws, butt fusion equipment (thermoplastics), hot air welding (thermoplastics) pressfit tool.

3. Use a variety of piping materials.Potential Elements of the Performance:

- Identify and select as required: copper tube, malleable iron, steel pipe, steel tube, cast iron fittings and thermoplastics.

4. Follow written or oral instructions required to perform calculations necessary 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
- Layout pipe and tubing for bending

5. 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 together by one or all of the following:
 - threading
 - flared fittings
 - compression fittings
 - soft solder
 - hard solder
 - rolled groove

6. *Layout and install drains and vents.*

Potential Elements of the Performance:

- provide an isometric drawing of the piping systems
- select the correct fittings as required by Ontario Building Code (O.B.C.) Part 7
- measure, cut and install the piping systems
- join the different piping materials using the approved methods
- test the piping system as required by Part 7

7. *Layout and install the water distribution piping for the required fixtures.*

Potential Elements of the Performance:

- select the proper piping materials for installation
- measure, cut and install the piping, fittings and valves required by Part 7 of the O.B.C.
- test the piping as per Part 7

8. *Install plumbing fixtures.*

Potential Elements of the Performance:

- connect the water closet to the flange
- install the basin in the counter top and connect to the drainage piping using the p-trap and proper transition fittings
- connect the bathtub to the drainage system
- test the installations for tightness / leakage

9. *Interpret and apply the Ontario Building Code Parts 7 and 9.*

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

III. TOPICS:

1. Protect Self and Others
2. **Safe** and **Proper** use of hand tools, power tools, cutting and welding equipment.
3. Pipe and fitting materials such as, but not limited to copper, steel, cast iron and thermoplastics.
4. Calculations required for offsets, fitting allowance, thread engagement, fitting fabrication, pipe and tube bending.
5. Pipe threading; roll grooving, soldering (hard and soft) fusion welding, pipe and tube bending.
6. Design and installation of drains, waste and vent piping
7. Design and installation of water distribution piping
8. Conformance to Parts 7 and 9 of the Ontario Building Code

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Handouts as supplied by instructor
- Basic Plumbing Manual Level II (available in bookstore)
- Building Code book
- Scientific calculator
- Measuring tape
- IPT hand book for piping suggested only as a resource material (available in the campus book store)
- Participation in HMI201 requires the use of safety boots and safety glasses at all times during lab hours (2), gloves and coveralls (no polyester materials). These items are not supplied by Sault College.
- Tools as supplied by the college

V. EVALUATION PROCESS/GRADING SYSTEM:

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

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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.



HMI201 Plumbing II – Course Plan

Week	Outcomes	Format	Hrs.	Topic/Content	Readings	Assignments	Assessment	Resources
1	1, 2, 3, 4, 5	Lecture	3	Review Plumbing I (HMI113)	Handouts, Plumbing Manual I	Handouts	Quiz	HMI113 notes, instructor's handouts and calculators
2	6, 9	Lecture	1	Review Ontario Building Code (OBC) Sec. 9 <u>Identify</u> Type and fitting materials and hangars	OBC section 9		Quiz	Plumbing manuals I and II for all weeks Building code book
		Lab	2	<u>Explain / Demonstrate</u> Floor joists, wall studs, floor and roof trusses, top and bottom plates Where floor joists may be drilled Backing plates / protection plates Electrolysis / corrosion factors Temporary, permanent, waterproof etc. (ICF forms)				
3	4, 6, 9,	Lecture	2	Drainage terms and definitions	Handout	Handout	Quiz	
				<u>Identify</u> Code for common drainage terms and definitions Use of OBC that contains drainage terms Common drainage terms / definitions: include backflow preventers, air breaks / gaps, indirect waste, etc.				
		Lab	1	<u>Apply</u> Create a basic drainage plan			Drainage drawings	AutoCAD

4	3, 4, 5, 6	Lecture	1	<i>Sanitary systems and storm sewers</i>	Handout	Handout	Drainage drawings	AutoCAD
				<u>Explain</u> Terms used for sanitary and storm sewers Combined and semi-combined drain systems and why combined drainage systems have been prohibited				
				<u>Identify</u> Components of a running hand hold trap Three drain designs, common drains				
		Lab	2	<u>Apply</u> Begin project – simulate drain systems i.e. ‘pipe up’ a rough in drainage system; test			Project - Lab assignment	
5		Lecture	3	<i>Review / Test #1</i>			Test #1	
6	6, 9	Lecture	1	<i>Ejectors and sumps</i>	Handout	Handout	Questions handout	Water alarm, various sizes of ejector and storm pipes used
				<u>Identify</u> Sewage ejector and storm sump Installation requirements Requirements of equipment selection				
				<u>Explain</u> Positions of a union, check, shut off valve Where a sump discharge may be connected				
		Lab	2	<u>Apply - Demonstration</u> How an ejector discharge pipe may be connected Requirements of a sewage ejector vent Ejector pit and pump Storm water pit and pump				

7	1, 2, 3, 4, 5,6,	Lecture	1	<i>Venting systems</i>	Handout	Handout		
				<u>Explain</u> Branch, wet, vent, circuit, yoke and offset relief vents				
		Lab	2	<u>Apply</u> Simulate branch, wet vents, dual and back vents continuous (i.e. 'pipe up')			Continue lab project (see week 4)	Vent piping, cutters and pipe joints
8	1, 2, 3, 4, 5, 7	Lecture	1	<i>Water distribution systems and sizing</i>	Handout	Handout		Piping, connectors, valves
				<u>Describe</u> Different ways a valve controls flow Four principal valve types Purpose of a valve <u>Explain</u> Sizing a system				
		Lab	2	<u>Apply</u> Sizing a system			Observation	
9				<i>Review / Test #2</i>			Test #2	
10, 11, 12	1, 2, 3, 4, 5, 7, 8	Lecture	3	<i>Plumbing fixtures, appliances and equipment and installations (3)</i> <u>Identify</u> Water closets, urinals, bidets, bathtubs, showers, lavatories, sinks	Handout	Handout	Assessment of installation, quiz	Water closets, urinals, bidets, bathtubs, showers, lavatories and sinks
				<u>Describe</u> typical problems / deficiencies				
	3, 6, 8	Lab	6	<u>Apply</u> Fixture installations (3 labs) with tests: Water closet, basin, bathtub			Practical assignments (major)	

13	6, 7, 8, 9	Lecture	1	<i>Codes and testing requirements</i>	Handout	Handout	Quiz	
				<u>Explain</u> Purpose of testing plumbing systems How a water test may be applied Purpose of an installation of a test fitting				
				<u>Identify</u> Related sections - part 7 of Code book The various types of testing Tools and equipment required to perform a water test				
		Lab	2	<u>Perform</u> A water test in the lab			Water test assessed	Completed projects (Pipe connections)
14	4	Lecture	2	<i>Trade calculations</i>	Handout	Handout	Calculations handed in	Calculator Plumbing manual I (section 3)
				<u>Explain</u> Area calculations, units of measure Formulas to calculate square and rectangles, circles and triangles Area of a square, rectangle, circle, trapezoid and triangle both in Imperial and SI units				
				<i>Read and interpret job specifications</i>	Handout	Handout	Hand in	Various drawings
				<u>Explain</u> Purpose of specifications Numbering system used in construction				
				<u>Identify</u> Appropriate sections of specifications Specifications relating to the plumbing system installation				
		Lab	1	<u>Apply</u> Research specifications to read and interpret the job				

15				<i>Review / Test #3</i>			Test # 3	
16				<i>Final Review</i> 3				