SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE:	Install Methods II		
CODE NO. :	ELR 123	**SEMESTER:**	2
PROGRAM:	Electrical Engineering Technician/Technologist		
AUTHOR:	R. Chartrand		
DATE:	01/2008	**PREVIOUS OUTLINE DATED:**	1/2007
APPROVED:			

_____ _____

CHAIR **DATE**

TOTAL CREDITS:	2
PREREQUISITE(S):	None
HOURS/WEEK:	3

I. COURSE DESCRIPTION:

This hands-on course introduces the student to residential wiring practices.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Correctly select and safely install common residential electrical wiring systems and equipment within the regulations and standards set out by the Canadian Electrical Code (CEC).
   Potential Elements of the Performance:
   - Demonstrate the correct installation procedures and wiring connections for common residential switching devices and outlets, ensuring strict adherence to CEC (Canadian Electrical Code) and NBC (National Building Code) regulations.
   - Demonstrate the proper installation procedures required for the following wiring methods while ensuring strict adherence to CEC regulations: non-metallic sheathed cable, armoured cable, mineral insulated cable, metallic sheathed cable, rigid conduits, flexible conduits, liquid-tight conduit, electrical metallic tubing, and electrical non-metallic tubing.
   - Demonstrate the ability to install a complete 100 amp, residential service including the following circuits: hot water heater, range outlet, dryer outlet, split duplex receptacle, bathroom outlet, outside weather-proof receptacle, general branch circuit.
   - Prepare a layout drawing for a service mast and indicate the procedure for installation.
   - Demonstrate the proper use of common hand tools used in the electrical trade.
   - Demonstrate the proper installation of enclosures and fittings common to the electrical trade.
   - Demonstrate the proper installation of cable, conduit and enclosure supports common to the electrical trade.
   - Demonstrate the proper techniques for the terminating of conductors.
   - Identify and terminate copper communication and hard wired cables for telephones.

III. TOPICS:

1. Residential Wiring Practices.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Ontario Electrical Safety Code (current edition) or Canadian Electrical Code Part 1 (Current Edition)
- Electrical Wiring Residential (Current Edition published by Delmar)
- Hand tools including tester, common screw drivers, diagonal pliers, side cutters, adjustable pliers, hack saw, claw hammer, tool pouch and tool box.

V. EVALUATION PROCESS/GRADING SYSTEM:

Shop activities, associated reports/ assignments :	50%
1 Final Practical test :	25%
1 Final Written test and or quizzes	25%
	100%

While marks are not given for attendance, marks may be deducted for classes missed. See Special Notes section.
The following semester grades will be assigned to students in postsecondary courses:

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:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

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.

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 Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

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.

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

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

General Lab Requirement for Write Ups

Lab 1 and Lab 2 require no write ups, the student only has to demonstrate these labs to the instructor and have them signed complete on their sheet.

Lab 2 through and including Lab 11 require write ups as outline below

1) Labs shall have a wiring diagram and CE code rules that relate to each lab as per instructions from the instructor.
2) Labs shall have a CAD wiring diagram of lab installation and related equipment.
4) Labs shall have Canadian Electrical Codes stated on the Lab Drawings
6) All labs assignments must neat and be turned in on hard copy and on computer disk before or no later than the last lab class of the semester. The disk will contain all programs, drawing in AutoCAD and word processor work.
7) Labs must be computer generated and labs that require tables shall be done in a spread sheet or in a word processor the can produce a table. **Hand written reports will not be accepted.**
8) Each lab may have specific requirement so read each lab carefully.
9) If the student is not clear on any of the requirements, it is his/her responsibility to ask the instructor for clarification.
10) All lab reports are to include a title page with the following information

- **Lab title and number**
- **Date Completed**
- **Names of group members**
- **Instructor's name**

11) Lab reports are to include all procedures, diagrams and observation etc required in this course outline for the lab write-up to be complete. The labs are to be in the order they were performed / demonstrated and numbered to match the lab handouts.
13) One lab report submission per group. Maximum 2 per group.

NOTE:

You must pass all sections of the course, theory, and the Lab portions of ELR 123 course to obtain a passing grade in this course. If the student passes all sections, the final mark will be the mark as state for each section added together for the final mark. That is the theory mark, and lab marks will be added to arrive at a final student average for this course. If the student fails theory test, Practical Test, or lab section of this course he/she will receive an F grade (failing grade).

Methods of Evaluation

Demonstration of Labs, Lab write-ups and tests etc. will constitute a total of 100% of your ELR 123 course mark. The distribution of marks is as stated in the previous pages.
NOTES:

- Attendance is compulsory and may be taken each and every lab class or at random.
- Two percent per lab class will be deducted for each schedule lab class missed without permission by a student from his final grade.
- Every student will be allowed to miss only one lab class without a doctor's slip without any marks being deducted for that missed lab class.
- Students missing more than 1 lab class must have a doctor's slip or the 2% per missed lab class will be deducted from his/her final lab mark.
- Example the second miss lab class will result in the student having 2% deducted from his/her final lab grade, e.g. Final mark of 100 % - 2% = 98% or 65% - 2%= 63%
- Students missing any lab classes will still be responsible to have the particular lab completed, not simply copied from other student. You must indicate to the instructor when you plan to do the lab, you will be responsible for making arrangements to complete the lab and demonstrate it to the instructor.
- All drawings or diagrams must be done in AutoCAD or instructor approved drawing program.
- All labs will contain the material that was stated in previous pages
- All labs must be demonstrated and signed off by instructor before any of the labs write up can be marked.
- The Lab completion sign off sheet must be in the front of the lab write-up book. When write-up are turned in for marking
- All labs must be turned in, in a binder, in order, by the last week of the course up to Friday noon for marking. No labs will be accepted for marking after the above deadline. No labs turned in will result in the student obtaining an F (fail) grade
- All labs must be signed by the instructor at the completion of each and every lab shop portion during the schedule lab class. Therefore when you have completed the lab steps and demonstrated the lab to the instructor, he/she will sign the lab and you may proceed with the next lab assignment. Auto Cad drawings, and all other lab requirements must be met before the labs can be handed in for marking.
- The student must demonstrate all lab projects assigned to the instructor to his/her satisfaction before the student can have the lab project signed by the instructor as being complete.
- The instructor may alter or give particular instructions, or additional instructions on a per lab bases

REMEMBER:

Read all labs completely and any additional material that is included or handed out by the instructor that pertains to the labs. The student is responsible to make sure that he / she have read all material pertaining to a lab before starting the lab.

ALL students must **Demonstrate all labs** to the instructor and have the instructor sign your sheet that each lab was completed successfully. The sheet will be given to you by the instructor during the first lab period.

Note: the sheet discussed above must be turned in with the lab write ups during the last lab class of the semester with all labs signed on the sheet and demonstrated to the instructor**.**

If the sheet is not with the lab write ups. The write ups will not be accepted for marking until the student re-demonstrates selected labs which the instructor will select as proof that the student has successfully completed the practical parts of the labs. The student will have to make arrangements with the instructor for a time to demonstrate his/her practical skill. If the student is successful in the practical demonstration his/her labs will be evacuated as if the student had turned in their signed sheet.

YOU ARE RESPONSIBLE FOR YOUR SHEET NO EXCUSES WILL BE ACCEPTED

Important Note:

- Attendance to shop activities is compulsory, unless discussed with the instructor in advance of the absence and the absence is for a medical or family emergency.
- Any student that is absent for any shop class will be required to provide a doctor's note immediately upon returning. Failing to do so will result in a grade of 0% being assigned to the missed shop activity.

At the instructor's discretions a deduction of 2% may be made from the student's final mark for each shop class or portion thereof missed.

NOTE: Each student must turn in his/her own sheet with each Project demonstration verified by the instructor signature. If the student does not turn the sheet with all Projects signed by the instructor the write-up will not be marked.

Assigned Labs

LAB #1 **Introduction To The Electrical Lab, Equipment, And Devices**

LAB # 2 **Lights, Switches And Receptacles** Note Receptacles Are Not Switched.

#1 15 amp feed first to the receptacle, then to switch and finally to the light.

#2 15 amp feed first to the light, from the light to switch and finally light to the receptacle.

#3 15 amp feed first to the light, then to the switch and from switch finally to the receptacle.

#4 15 amp feed first to the switch, then to light and from light finally to the receptacle.

LAB #3 **3-Way Switch Circuits**

#1 15 amp feed first to one 3-way switch, then to the other 3-way switch and finally to the light.

#2 15 amp feed first to the light, from the light to one 3-way switch and finally to the other 3-way switch.

#3 15 amp feed first to the light, then each switch from the light.

#4 15 amp feed first to the one 3-way switch, then to the light, then to the other 3-way switch.

LAB #4 **4-Way Switch Circuit**

15 amp feed first to the one 3-way switch, then to the light, then to the other 4 & 3 way switch.

Lab #5 A Kitchen Split Receptacle

Lab #6 Dryer Receptacle install and draw, Only draw Range Receptacle.

Lab #7 Door Bell Installation

Lab #8 **Fluorescent Light With Ac90.**

Fluorescent light and receptacle installation using armoured cable(AC90).

Lab #9 3 Wire Split Circuit

One light and one receptacle on each haft of the wire split circuit using only 3 conductor cable for lights & rec. 2 conductor for Switches

Lab #10 **Emt Protect**

GFCI Receptacle for surface mount

Lab #11 **SERVICE INSTALLATION** Overhead & Underground Drawing only

Note; do a drawing for both an Overhead Service 200 amp service and Underground 100 amp service include all necessary equipment type and size, conductor type and size and related codes.

Lab # 12 To be practical test assigned by instructor.

NOTE: Refer to the C.E.C. code and list the references and rules that apply to these installation.

Note: All 10 labs must be completed, demonstrated and the write-ups must be turned into the instructor before a student will be permitted to do the practical test. Therefore the student must complete all lab requirements to be able to take the final practical test. A student will receive a mark of zero (0) for the practical test if he/she does not meet the above mentioned requirements or does not complete the practical test.

Example of Student Lab Evaluation Sheet

Student's Name_____

Lab #	Marks shown are max. deductions per lab for unsatisfactory and or poor or sloppy work related to each lab at the discretion of the instructor	Overall Demo	Instructor's Signature	Write-up Mark %
1	**Introduction To The Electrical Lab, Equipment, And Devices**	No mark	no write up or demo	No mark
2	**Lights, Switches And Receptacles** Note Receptacles Are Not Switched. **#A** 15 amp feed first to the receptacle, then to switch and finally to the light. **#B** 15 amp feed first to the light, from the light to switch and finally light to the receptacle. **#C** 15 amp feed first to the light, then to the switch and from switch finally to the receptacle. **#D** 15 amp feed first to the switch, then to light and from light finally to the receptacle.	20	A_____ B_____ C_____ D_____	15%
3	**3-Way Switch Circuits** **#A** 15 amp feed first to one 3-way switch, then to the other 3-way switch and finally to the light. **#B** 15 amp feed first to the light, from the light to one 3-way switch and finally to the other 3-way switch. **#C** 15 amp feed first to the light, then each switch from the light. **#D** 15 amp feed first to the one 3-way switch, then to the light, then to the other 3-way switch.	20	A_____ B_____ C_____ D_____	15%
4	**4-Way Switch Circuit** 15 amp feed first to the one 3-way switch, then to the light, then to the other 4 & 3 way switch.	10		10%
5	**A Kitchen Split Receptacle**	5		5%
6	**Dryer Receptacle install and draw**, Only draw Range Receptacle.	5		10%
7	Door Bell Installation	5		5%
8	**Fluorescent Light With Ac90.**	5		5%
9	**3 Wire Split Circuit** One light and one receptacle on each haft of the wire split circuit using only 3 conductor cable for lights & rec. 2 conductor for Switches	15		10%
10	**Emt Protect** GFCI Receptacle for surface mount	15		5%
11	**SERVICE INSTALLATION** **A. Overhead B. Underground**	No mark	A_____ B_____	20%
	Total Marks	100		100

STUDENT COURSE AGREEMENT (Please print)

I, _____ student ID # _____
with regards to the course known as ELR 223 PLC CONTROL SYSTEMS
COURSE CODE # **ELR 223** have read and understood the course content, outline and expectations which clearly states the following:

1- Absolutely no make up tests or exams will be administered with the exceptions of personal illness or death of an immediate family member both requiring written verification.

2- All labs must be handed in by the due date or a grade of 0 will be awarded.

3- Lab & lecture attendance are compulsory. Any lecture notes, lab assignments etc. missed will become the student's responsibility to retrieve from another student.

4- Lab or lecture quizzes can be presented at anytime without prior notification.

5- All Labs must be completed during assigned Lab times unless prior approval is obtained form the instructor.

6- Students must be able to demonstrate labs that are assigned by the instructor after the due date if requested by the instructor. Each student must be sure that he / she can duplicate the lab that they turned in on or before the due date. If the student cannot duplicate the lab to the satisfaction of the instructor, a grade of 0% will be assessed to that particular lab. Demonstration request will be at the discretion of the instructor.

7- In order to maintain a passing grade the student must obtain a minimum 50% average in all subject sections that the course may have, such as, the theory Tests section, Practical Tests section, Lab & Lab Write-ups and Demonstrations of Labs to Instructor section

8- Students are not permitted to work on live equipment outside of regular class time.

9- Students must supply their own hand tools, meters and safety glasses. Students will not be permitted in the lab without safety glasses and the student must wear the safety glasses whenever working on live equipment. Students must never work alone in the lab. Unsafe work habits, improper behavior will not be tolerated.

10- I have read and understand the requirements outlined above and in the course outline.

_____ _____
(Student's Signature) (Date)