SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: MEASUREMENTS AND SHOP PRACTICES

CODE NO.: ELR-114

PROGRAM: ELECTRICAL/ELECTRONIC TECHNICIAN

SEMESTER: ONE

DATE: SEPTEMBER 1993

PREVIOUS OUTLINE DATED: SEPTEMBER 1992

AUTHOR: EDWARD SOWKA

NEW:_____ REV.: X

APPROVED: D McConnell 93-08-30
DEAN DATE

W Fidipowich Aug 30/93
COORDINATOR DATE

MEASUREMENTS AND SHOP PRACTICES — ELR114
COURSE NAME — CODE NO.

TOTAL CREDIT HOURS: 36

PREREQUISITE(S): NONE

PHILOSOPHY/GOALS:

THIS COURSE WILL PROVIDE THE STUDENT WITH A SOUND UNDERSTANDING OF OPERATING PRINCIPLES, CHARACTERISTICS AND LIMITATIONS OF COMMONLY USED ELECTRONIC TEST EQUIPMENT. IT WILL ALSO INTRODUCE THE STUDENT TO ELECTRONIC SHOP PRACTICES INCLUDING THE CORRECT USE OF COMMON TOOLS. APPROXIMATELY 60% OF CLASS TIME WILL BE SPENT ON LABORATORY EXERCISES TO DEVELOP SKILLS IN THE USE OF THIS EQUIPMENT.

STUDENT PERFORMANCE OBJECTIVES:

UPON SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENT WILL BE ABLE TO:

1. Accurately identify common electronic components, determine their electrical characteristics, recall and draw their schematic symbols.

2. Recall and understand the the Block Diagram of a Voltmeter, Ammeter, Ohmmeter and Oscilloscope.

3. Demonstrate the correct operation of the following equipment to measure voltage current and resistance;
   - Digital Voltmeter
   - Analog VOM
   - Oscilloscope
   - Wheatstone Bridge

4. Identify and understand the use of common tools used in electronic repair.

5. Demonstrate the correct use of these tools to remove/insert electronic components on Printed Circuit Boards and make simple wire connections.

6. Understand Surface Mount Technology and its impact on soldering/desoldering techniques. *NOTE* This topic is optional, time permitting.

MEASUREMENTS AND SHOP PRACTICES — ELR-114
COURSE NAME — CODE NO.

TOPICS TO BE COVERED:

1. ELECTRONIC COMPONENT IDENTIFICATION
2. ELECTRONIC TEST AND MEASURING EQUIPMENT
3. SOLDERING / DESOLDERING TECHNIQUES

LEARNING ACTIVITIES	REQUIRED RESOURCES
1.0 ELECTRONIC COMPONENT IDENTIFICATION	-TEXT:ELECTRONIC ASSEMBLY -Reference Text: Electrical Fundamentals by D.A. Bell -Instructor Handouts -Video"Electronic Component Recognition" -Read UNITS 1&2
UPON SUCCESSFUL COMPLETION OF THIS BLOCK OF WORK, THE STUDENT WILL BE ABLE TO:	LAB ACTIVITY FOR 1.0 : "ELECTRONIC COMPONENT I.D." "EXPERIMENTS 1 & 2"
1.1 Correctly identify common electronic components.	-PROBLEMS:PG.19-24 PG.52-62
1.2 Recall and understand the electrical characteristics of these components.	
1.3 Recall and draw the schematic symbols of these components.	
1.4 Recall and apply the Resistor & Capacitor Color Code.	
2.0 BASIC ELECTRONIC TEST EQUIPMENT	-Manufacturers' operator manuals -Instructor handouts
UPON SUCCESSFUL COMPLETION OF THIS BLOCK OF WORK, THE STUDENT WILL BE ABLE TO:	LAB ACTIVITIES FOR 2.0 :
2.1 Recall and understand the Block Diagram of a basic Voltmeter, Ammeter and Ohmmeter.	"OHMS LAW"
2.2 Correctly operate the following equipment: i) Keithley 169 DMM ii) Simpson 260 VOM iii) Anatek 50-1S DC Power Supply	"SERIES CIRCUITS" "PARALLEL CIRCUITS" "COMBINATION CIRCUITS"

LEARNING ACTIVITIES	REQUIRED RESOURCES
2.3 Correctly and accurately measure Voltage, Current and Resistance in Series, Parallel and Series/ Parallel Combinational circuits.	
3.0 OTHER ELECTRONIC TEST EQUIPMENT	-Manufacturers operator manuals
UPON SUCCESSFUL COMPLETION OF THIS BLOCK OF WORK, THE STUDENT WILL BE ABLE TO:	-Instructor handouts
3.1 Recall and understand the block diagram of a basic oscilloscope.	LAB ACTIVITIES FOR 3.0
3.2 Correctly operate the LBO-1021 oscilloscope to measure Period, Amplitude and Frequency of waveforms.	"OSCILLOSCOPE LAB"
4.0 MEASUREMENT LOADING EFFECT	-Instructor handouts
UPON SUCCESSFUL COMPLETION OF THIS BLOCK OF WORK, THE STUDENT WILL BE ABLE TO:	LAB ACTIVITIES FOR 4.0
4.1 Define and understand the term "Loading Effect".	"LOADING EFFECT LAB"
4.2 Calculate the ideal and actual values for voltage and current.	
4.3 Interpret voltage and current measurements to determine the degree of loading effect.	
5.0 SOLDERING/DESOLDERING TECHNIQUES	- Instructor Handouts - Soldering Inspection Video - UNITS 4-7 (TEXTBOOK)
UPON SUCCESSFUL COMPLETION OF THIS BLOCK OF WORK, THE STUNDENT WILL BE ABLE TO:	
5.1 Identify and understand the use of common tools and equipment for electronic repair.	
5.2 Correctly use the equipment to remove/insert components on PCB's and make simple wire connections.	
5.3 Understand (SMT) Surface Mount Technology and its impact on Soldering/Desoldering Techniques	

MEASUREMENTS AND SHOP PRACTICES — ELR-114
COURSE NAME — **CODE NO.**

METHOD(S) OF EVALUATION

1. THE GRADING SYSTEM USED WILL BE AS FOLLOWS:
   A+ = 90 - 100%
   A = 80 - 89%
   B = 70 - 79%
   C = 55 - 69%
   R = REPEAT

2. The Student may be tested at the completion of each block of work. At least one weeks notice will be given for these and other major tests. Major tests can be theoretical, practical or a combination of both.

3. Quizzes will be given without notice.

4. Each student will be subjectively evaluated by the Instructor and/or the Technologist based on demonstrated skills in the use of equipment, work habits, participation attitude, attendance and proffessional work ethic.

5. As the course is only 2 hrs./week and is designed to develop skills and work ethics, attendance is compulsory unless previously discussed with the Instructor.

6. FINAL ASSESMENT :
   60% - Practical work, tests and exercises
   30% - Theory tests and quizzes
   10% - Subjective

   100% - TOTAL

REQUIRED STUDENT RESOURCES:

1 - Textbook: ELECTRONIC ASSEMBLY
Concepts and Experimentation
Frederick W. Hughes
1 - Toolkit (Available in Campus Shop)
1 - Electronic Components Package *
1 - Protoboard

NOTE The Instructor will provide you with a list of the contents on the first scheduled class.

Additional resources such as Equipment manuals, Supplier catalogues and Lab exercises will be supplied by the Instructor or the Technologist when required.

MEASUREMENTS AND SHOP PRACTICES — ELR-114
COURSE NAME — CODE NO.

ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:

1. Robert Villanucci Electronic Techniques: Shop Practices and Construction Prentice-Hall 1986 3 ed.

2. Dale R. Patrick Electronic Instruments Prentice-Hall 1992

SPECIAL NOTES:

The instructor reserves the right to modify the course as is deemed necessary to meet the needs of the students.