SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Measurements and Shop Practices

CODE NO. : ELR114 **SEMESTER:** ONE

PROGRAM: Electrical Engineering Technician
- Process Automation
- Process Automation &Trades
- Power Generation
- Instrumentation Technician

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

APPROVED:

"Corey Meunier"

CHAIR **DATE**

TOTAL CREDITS: THREE

PREREQUISITE(S): NIL

HOURS/WEEK: TWO

I. COURSE DESCRIPTION:

This course will provide the student with a working knowledge of operating principles, characteristics and limitations of common electronic test equipment and electrical wiring practices. The course introduces basic electrical/electronic components, their electrical characteristics and testing procedures, as well as electronics' shop practices, including safety and the proper use of tools.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Accurately identify common electronic components, their electrical characteristics and testing procedures.

Potential Elements of the Performance:

- Correctly identify common components via their physical properties.
- Correctly identify electrical characteristics of common components.
- Accurately identify and draw the schematic symbol of common components.
- Accurately perform common testing of components.
- Recall and accurately apply the Resistor / Capacitor / Inductor Colour Code.

2. Correctly and accurately measure AC and DC Voltage, Current and Resistance using common Test Equipment.

Potential Elements of the Performance:

- Recall and apply basic techniques for measuring voltage, current and resistance.
- Accurately measure V, I, and R in Series Circuits, Parallel Circuits and Combination Resistive Circuits.
- Define and understand the term "Loading Effect".
- Correctly wire and test a switch, light and receptacle
- Correctly wire and test a 3-way switch and light.
- Correctly wire and test a split receptacle and a switched receptacle
- Correctly calibrate and accurately use an oscilloscope to measure amplitude and period of sinusoidal waveforms.

3. Correctly and safely identify and use typical hand tools, soldering and de-soldering equipment to repair and maintain electronic equipment.

Potential Elements of the Performance:

- Correctly identify common hand tools and their use.
- Correctly and safely use common hand tools.
- Correctly and safely use soldering/de-soldering equipment to make simple wire connections, cables and to remove/insert components on printed circuit boards (PCB's)

4. Use soldering, wiring and assembly techniques to build a working DC power supply for electronic equipment.

Potential Elements of the Performance:

- Correctly insert components on the PCB.
- Correctly solder components on the PCB.
- Connect and demonstrate the operation of the completed supply noting simple wire connections, including cabinet completion.

III. TOPICS:

1. Electronic Component Identification
2. Electronic Test and Measuring Equipment
3. Soldering / De-soldering Techniques
4. Basic wiring Techniques

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- First Year Electronic Parts Package (including Breadboard, Components, Safety Glasses, leads etc) AVAILABLE FROM THE INSTRUCTOR NOT THE BOOKSTORE
- Basic Hand Tools (Not in Parts Package - List will be supplied by instructor)
- Two (2) Duo tang Covers minimum
- Electronics Pocket Handbook by D. Metzger (optional reference)
- Additional resources will be outlined / distributed by the instructor

V. EVALUATION PROCESS/GRADING SYSTEM:

25% = Practical lab tests and quizzes
50% = Lab Reports
25% = Power Supply Project Completion

All lab reports required for submission, a passing grade on the practical test and the power supply report must be completed and handed-in or an Incomplete grade will result.

Rewrites are permitted for the practical test with a maximum grade of 60% possible.

All lab reports are to be submitted in a three-tab duo tang folder; NOT a three-ring binder.

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.

No re-write will be given for completed tests.

Any student that is absent for any test or surprise quiz (maximum 5% of final grade) must contact either the Instructor, the Deans' office or the switchboard **PRIOR to the test,** and may be required to provide a doctors' note upon returning. Failing to do so will result in a grade of 0% being assigned to the missed test with no rewrite option.

Any student that is absent for any lab must contact the Instructor for a copy of the lab and to **arrange a time to complete the lab.** As these are hands-on labs, you simply **do not copy the results from your partner**. As such, the sign-in sheet provided for each lab is essential for you to sign. If a student arrives late for, or is not continuously present and actively participating in the lab session (scheduled breaks excepted) he/she will be considered absent for the entire class and will not be permitted to submit the associated lab report.

Laboratory Reports:

All Lab Reports are due at the start of the following weeks' Lab Class unless otherwise stipulated by the instructor. A ***penalty of 10% per day*** will be assessed for late submissions (Weekends included). Students submitting on weekends are to call Security at 2712 from the lobby and have the assignment date stamped.

All Lab Reports must be submitted in a Duo Tang cover and must include the following:

- ***A cover sheet with course code, student name and student number, date completed, date due***
- ***All data taken in the order in which it is presented in the lab hand-out***
- ***All report questions completed including theoretical calculations and written analysis regarding the correlation of the data collected vs. the theoretical values.***

Safety:

Students must continuously wear all Sault College required personal protective equipment (PPE) during lab activities. Failure to do this will result in expulsion from the lab activity and a grade of zero being assigned. Students are expected to be wearing their required PPE prior to entering the lab. The instructor will advise what specific PPE is required. If a student repeatedly neglects to wear PPE as required he/she will be considered to be in violation of the Sault College Academic Code of Conduct and may be sanctioned accordingly (see Student Code of Conduct & Appeal Guidelines). For instance, first violation - verbal warning, second violation - written warning, third violation - suspension from lab activities. Students must complete a lab safety orientation prior to participating in lab activities. Successful completion of this orientation will be demonstrated by the student completing a quiz with a minimum grade of 100%.

VII. COURSE OUTLINE ADDENDUM:

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