

I. COURSE DESCRIPTION:

This course introduces the student to three phase AC transformers, motors, loads and associated equipment. Lab exercises will provide the students with hands-on experience with typical commercial AC motor control circuit connections.

The student will develop an understanding of the hardware and software associated with the Allen Bradley 5 family PLCs. PLC programming techniques using RS logic 5 software will be used to design, document and commission basic to intermediate PLC lab assignments.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. *Connect, test and analyze single phase and poly phase transformers.*Potential Elements of the Performance:

- Describe and demonstrate the operation of single-phase transformer in terms of polarity, impedance and winding ratios.
- Describe and demonstrate the operation of three phase transformers in wye and delta configurations.
- Describe and demonstrate three phase transformer connections for RLC balanced loads.
- Describe and demonstrate single and three phase autotransformers for reduced voltage motor starting

2. *Connect, test and analyze wound rotor motors.*Potential Elements of the Performance:

- Identify the mechanical parts, windings and connections for three phase wound rotor induction motors.
- Describe and demonstrate the operation of a three phase wound rotor induction motor and its external control circuits.
- Connect and describe the effects of differing resistances in the rotor circuit of a wound rotor motor under varying loads.

3. *Connect, test and analyze synchronous and squirrel cage motors.*Potential Elements of the Performance:

- Describe and demonstrate the operation of synchronous motors in power factor correction and constant speed applications.
- Describe and demonstrate the controller circuit for a two-speed squirrel cage motor.

III. TOPICS:

1. Single phase and poly phase transformers.
2. Wound rotor motors.
3. Synchronous motors.
4. Squirrel cage motors.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Notes supplied by instructor
- Hand tools
- Safety Glasses, High Voltage Gloves

V. EVALUATION PROCESS/GRADING SYSTEM:

Test 1 (machines)	15 %
Practical Test 1 (machines)	15 %
Lab Write-ups (machines)	20 %
Total	50 %

The other 50% for this course is made up of the PLC labs

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 apprenticeship courses:

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.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

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