



## COURSE OUTLINE: ELR821 - ELECTRONICS LEVEL 3

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ELR821: ELECTRONICS - LEVEL 3
<b>Program Number: Name</b>	6522: CONST & MTCE ELE ADV 6542: IND.ELECT. - ADVCD.
<b>Department:</b>	ELEC. APPRENTICES
<b>Semesters/Terms:</b>	21W, 20F, 19W
<b>Course Description:</b>	The student will demonstrate knowledge of AC and DC solid state motor drives and associated equipment. The student will demonstrate hands-on lab procedures with typical commercial AC and DC motor drives to support the theoretical knowledge.
<b>Total Credits:</b>	6
<b>Hours/Week:</b>	6
<b>Total Hours:</b>	60
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems.
<b>Course Evaluation:</b>	Passing Grade: 50%, D  A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	The student must obtain a minimum of 50% individually in both testing and shop activities in order to pass. Obtaining an individual mark less than 50% in either Theory (tests) or Lab (shop activities) marks will result in an overall F grade.  Surprise quizzes, all equally weighted, may be given for a maximum of 5% of the final grade which will be attributed towards the overall theory percentage.  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.

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



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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.

**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.

**Cell Phone Use**

Cell phones in the classroom are to be put on Silent or Vibrate during lectures, and labs.

Ringling or texting during class will result in a deduction of 5% from the final grade per event.

During Tests, Cell Phones are to be SHUT OFF and put away, and are not to be used as a calculator.

Should your phone ring during a test you will be asked to hand your test in and immediately leave the classroom.

If I see your cell phone during a test you will be asked to hand your test in and immediately leave the classroom.

A Grade of 0% will be issued for that test.

If a student misses a test/lab he/she must have a valid reason (i.e. medical or family emergency - documentation may be required).

In addition, the instructor must be notified prior to the test or lab sitting.

If this procedure is not followed the student will receive a mark of zero on the test/lab with no make-up option.

Students may not submit lab reports for labs in which they were not in continuous attendance and actively participating, resulting in a grade of 0. All lab reports are to be submitted by the assigned deadline or will receive a grade of 0 with no option of re-write or submission.

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 (safety glasses will definitely be required).

**Course Outcomes and Learning Objectives:**

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Connect, test and analyze single- and polyphase diode rectifier circuits.	1.1 Describe and demonstrate the operation of single-phase half wave and full wave rectifiers. 1.2 Describe and demonstrate the operation of three-phase star (half wave) and full wave rectifiers.

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	1.3 Describe and demonstrate operation of six-phase star (half wave) rectifiers. 1.4 Perform calculations relevant to each type of rectifier.
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Connect, program and test DC motor drive systems.	2.1 Identify the major components of a DC drive system. 2.2 Describe the relationship between firing angle, load voltage, CEMF, and motor speed. 2.3 Describe four-quadrant control of a DC motor. 2.4 Describe open and closed loop DC speed control systems and describe their characteristics. 2.5 Describe the operation and application of encoders, resolvers, and tachogenerators as feedback devices. 2.6 Explain the operation of a DC chopper drive controller. 2.7 Connect a commercially available SCR speed controller to a DC motor, calibrate the controller for the motor and confirm its operation. 2.8 Describe and demonstrate the procedure for testing the output SCRs of a DC motor control system for proper operation. 2.9 Perform calculations as appropriate for DC motor drive systems
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Connect, program and test AC motor drive systems.	3.1 identify the major components on a commercially available AC Variable Speed Drive including rectifiers, power supply components, and inverter components. 3.2 Describe the operation of a three-phase AC Variable Speed Drive Controller. 3.3 Connect, calibrate and confirm the operation of a commercially available AC Variable Speed Drive Controller. 3.4 Explain the procedure to test, remove, and replace if necessary, the output transistors in a variable speed drive. 3.5 Define and understand harmonics, and describe their causes and effects on AC Systems. 3.6 Describe the operation of reactors and their application to AC Variable Speed and DC Motor Drive Systems as a method used to control harmonics on AC Power Systems. 3.7 Explain the basic principles of serial communication, including the ASCII code and signal waveforms. 3.8 Identify common serial communication hardware and protocols. 3.9 Perform calculations as appropriate for AC motor drive systems

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Lab Reports	40%
Tests (3 evenly weighted)	60%

**Date:**

May 25, 2020

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**Addendum:**

Please refer to the course outline addendum on the Learning Management System for further information.

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