



# COURSE OUTLINE

## RAA105

Prepared: J. Paloniemi / Robert Allen    Approved: Corey Meunier

<b>Course Code: Title</b>	RAA105: BASIC ELECTRICITY								
<b>Program Number: Name</b>	4068: ROBOTICS AUTOMATION								
<b>Department:</b>	ROBOTICS GRADUATE CERTIFICATE								
<b>Semester/Term:</b>	17F								
<b>Course Description:</b>	This is an electrical theory course in DC electric circuits. Atomic theory will be introduced along with voltage, current, resistance, power and energy in electric circuits. Ohms Law and Kirchhoffs Laws will be studied as they relate to series, parallel and combination circuits. Resistivity and magnetism will also be introduced.								
<b>Total Credits:</b>	2								
<b>Hours/Week:</b>	0								
<b>Total Hours:</b>	30								
<b>This course is a pre-requisite for:</b>	RAA202, RAA204								
<b>Vocational Learning Outcomes (VLO's):</b>  Please refer to program web page for a complete listing of program outcomes where applicable.	#5. Validate and optimize the functioning of motor, drive, control, and robotic systems. #7. Formulate and use a variety of troubleshooting techniques on new and legacy electromechanical equipment, processes, systems and subsystems.								
<b>Essential Employability Skills (EES):</b>	#3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems.								
<b>Course Evaluation:</b>	Passing Grade: 50%, D								
<b>Evaluation Process and Grading System:</b>	<table border="1"> <thead> <tr> <th>Evaluation Type</th> <th>Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td>Assignments</td> <td>15%</td> </tr> <tr> <td>Class Participation</td> <td>5%</td> </tr> <tr> <td>Tests and Quizzes</td> <td>80%</td> </tr> </tbody> </table>	Evaluation Type	Evaluation Weight	Assignments	15%	Class Participation	5%	Tests and Quizzes	80%
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<b>Books and Required</b>	Delmar's Standard Textbook of Electricity by Stephen L. Herman								



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### Resources:

Edition: 6  
ISBN: 978-1-285-85270-6

### Course Outcomes and Learning Objectives:

#### Course Outcome 1.

Demonstrate an understanding of atomic theory.

#### Learning Objectives 1.

- o Describe the requirements for a simple electric circuit.
- o Define voltage, current and resistance.
- o Define work, power and energy.
- o Convert between mechanical and electrical units of work, power and energy.
- o Calculate energy in kilo-watt hours.
- o Describe the effects of current on the human body.

#### Course Outcome 2.

Analyze and calculate voltage, current and power in 2-wire and 3-wire distribution systems

#### Learning Objectives 2.

- o Apply Ohm's Law to analyze series DC circuits.
- o Apply Kirchoff's Law to analyze series DC circuits.
- o Apply Ohm's Law to analyze parallel DC circuits.
- o Apply Kirchoff's Law to analyze parallel DC circuits.
- o Apply Ohm's Law to analyze combination DC circuits.
- o Apply Kirchoff's Law to analyze combination DC circuits.
- o Operate a digital meter to determine voltage and current

#### Course Outcome 3.

Define and calculate efficiency of electrical distribution systems.

#### Learning Objectives 3.



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- o Perform calculations relating to wire measurements, AWG, SI units, resistivity, line loss, and temperature coefficients.
- o Name and explain the principles of operation of common sources of EMF.
- o Describe the characteristics of primary and secondary cells.
- o Contrast and compare different switches and normally open/closed contacts used in industry

### **Course Outcome 4.**

State the Fundamental Law of Magnetism

### **Learning Objectives 4.**

- o Define permanent and temporary magnets.
- o Describe magnetic lines of force and list their characteristics.
- o Describe the relationship between magnetism and induced EMF.

**Date:**

Friday, September 1, 2017

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