# COURSE OUTLINE: ELR104 - ELECTRICAL FUNDAMENT

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

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| **Course Code: Title** | ELR104: ELECTRICAL FUNDAMENTALS |
| **Program Number: Name** | 4061: AVIATION TECHNOLOGY |
| **Department:** | ELECT./INSTRUMENTATION PS |
| **Semesters/Terms:** | 19W |
| **Course Description:** | An introductory course designed to give an overview of terms, devices, symbols and analysis techniques used in DC circuits, as they relate to the Aviation Industry. Topics include series, parallel and series-parallel DC circuit analysis. Other topics include an introduction to magnetism and magnetic devices, inductors and capacitors and their principle operation in DC circuits, an introduction to AC circuits, phasor diagrams and RLC circuit analysis basics. The course will be directed towards Aircraft systems, and all course material will be related to aircraft components, including Aircraft Batteries, Motors, Generators, and Power distribution, with a focus on reading, and understanding Aircraft General Electrical Systems Schematics, as found in any Aircraft Manual. |
| **Total Credits:** | 3 |
| **Hours/Week:** | 3 |
| **Total Hours:** | 45 |
| **Prerequisites:** | AVF111, AVF115, AVF117, AVT119, CMM115, GEN100, MTH612, PHY125 |
| **Corequisites:** | There are no co-requisites for this course. |
| **This course is a pre-requisite for:** | AFT130, AVF241, AVF242, AVF245, AVT248, ELN224 |
| **Essential Employability Skills (EES) addressed in this course:** | EES 3 Execute mathematical operations accurately.<br>EES 4 Apply a systematic approach to solve problems. |
| **Course Evaluation:** | Passing Grade: 50%, D |
| **Books and Required Resources:** | Aircraft Electricity and Electronics by Thomas K. Eismin<br>Publisher: McGraw-Hill Edition: 6<br>ISBN: 978-0071799157<br><br>Scientific Calculator, similar to Sharp EL-520W |

**Course Outcomes and Learning Objectives:**

| Course Outcome 1 | Learning Objectives for Course Outcome 1 |
|---|---|
| 1. Analyze Series, Parallel and Series-Parallel DC circuits containing voltage and current sources and resistors, to determine individual voltage, current and power values. | 1.1 Complete mathematical questions from text and assignments<br>1.2 Choice and use of network Theorems to aid in analysis |

| Course Outcome 2 | Learning Objectives for Course Outcome 2 |
|---|---|
| 2. Analyze magnetic properties of circuits and devices. | 2.1 Determine the direction of magnetic flux present as a result of DC current flow in a conductor.<br>2.2 Determine the direction of magnetic flux present as a result of DC current flow in a coil<br>2.3 Determine the direction of rotation of a simple dc motor<br>2.4 Determine the direction of current flow in a simple dc generator<br>2.5 Completion of DC machine diagrams showing flux fields, main fields and rotation |
| **Course Outcome 3** | **Learning Objectives for Course Outcome 3** |
| 3. Analyze a DC circuit containing inductors or capacitors and resistors, to determine charge and discharge characteristic values. | 3.1 Completion of RL and RC circuit questions regarding time constants<br>3.2 Completion of RL and RC circuit questions requiring the solution of the time for threshold voltage or current achievement |
| **Course Outcome 4** | **Learning Objectives for Course Outcome 4** |
| 4. Analyze an AC circuit containing inductors and capacitors, to determine total impedance, current, phase angles and power factor. | 4.1 Completion of AC sine wave characteristics questions<br>4.2 Completion of impedance calculations in AC circuits<br>4.3 Current and voltage phase angle calculations<br>4.4 Power factor correction in parallel AC circuits |
| **Course Outcome 5** | **Learning Objectives for Course Outcome 5** |
| 5. Practical knowledge of Aircraft Electrical Systems, and basic ability to read and understand schematic drawings. | 5.1 Aircraft starters, generators, and related control circuits.<br>5.2 Power Distribution Systems<br>5.3 Design and maintenance of aircraft electrical systems. |

**Evaluation Process and Grading System:**

| Evaluation Type | Evaluation Weight | Course Outcome Assessed |
|---|---|---|
| Assignments and Quizzes | 20% | |
| Attendance | 5% | |
| Tests | 75% | |

**Date:** December 17, 2018

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