

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Digital Electronics and Avionics  
**CODE NO. :** ELN224 **SEMESTER:** 4  
**PROGRAM:** Aviation Flight  
**AUTHOR:** A. Gooderham  
**DATE:** AUG 04 **PREVIOUS OUTLINE DATED:** JAN 03  
**APPROVED:**  

	_____ DEAN	_____ DATE
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**TOTAL CREDITS:**  
**PREREQUISITE(S):** ELR104  
**HOURS/WEEK:** 3

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*For additional information, please contact Colin Kirkwood, Dean*  
*School of Technology, Skilled Trades & Natural Resources*  
*(705) 759-2554, Ext.688*

**I. COURSE DESCRIPTION:**

This course is a study of modern Analog and Digital devices and circuits. The student will study Electronic Devices, Digital Numbering Systems, Boolean Algebra, common Digital Integrated circuits, as well as other pulse shaping / generating and switching circuits. Emphasis will be placed on the analysis and application of these devices and circuits in the Aviation Industry. Rounding out the course is an Avionics component covering the flight instruments and electronic circuits which produce, transmit and condition analog and digital signals including transmitting / receiving systems.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

1. Understand the characteristics and operation of basic semiconductor devices ( Diode, Zener, LED, LCD and Light Detecting Diodes)

Potential Elements of the Performance:

- Describe the operation of single PN junction devices
- Describe basic electrical characteristics of these devices

2. Understand the application of basic semiconductor devices ( Diode, Zener, LED, LCD and Light Detecting Diodes)

Potential Elements of the Performance:

- Describe the operation of various rectifiers.
- Describe the operation of zener voltage regulators
- Calculate quantities associated with rectification / voltage regulation.

3. Understand the characteristics and operation of Bi-Polar Junction Transistors ( BJT's ).

Potential Elements of the Performance:

- Describe the operation of PNP and NPN Transistors.
- Describe basic electrical characteristics of Transistors

4. Understand the application of Transistors in Switching and Amplifier Circuits.

Potential Elements of the Performance:

- Describe the operation of a basic transistor switch circuit.
- Calculate quantities associated with the operation of a transistor switch.
- Describe the operation of a BJT Amplifier
- Calculate quantities associated with the operation of various Biasing Methods.

5. Understand the operation of basic Digital Integrated Circuit functions.

Potential Elements of the Performance:

- Describe the difference between Analog and Digital
- Understand various Digital Numbering Systems, and be able to convert between Decimal, Binary, Octal, Hexadecimal and ASCII.
- Describe the operation of basic digital functions Algebraically (Boolean), with a Truth Table and Descriptively.

6. Understand the operation of basic RF Communication Circuits / Systems

Potential Elements of the Performance:

- Understand the Radio Frequency Spectrum as prescribed by D.O.C. and F.C.C.
- Describe the theory / concepts of Radio Frequency communication ( Transmission / Reception )
- Describe basic RF modulation techniques ( AM / FM )
- Describe the principles of Antennas and RF Wave propagation.
- Describe the major components of an aircraft communication system.

### III. TOPICS:

1. Electronic Semiconductor Devices and Applications
2. Digital Electronics
3. Avionics and RF Communication Systems
4. Other Devices and Transducers \*\* (as time permits)

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

Electronics a Complete Course, 2<sup>nd</sup> Ed. By Cook  
 Additional handouts will be supplied by the Instructor.

**V. EVALUATION PROCESS/GRADING SYSTEM:**

The final grade will be derived as follows;

3 Theory Tests – each worth 33.3%  
 Surprise Quizzes or Assignments – worth 5% max can be given at  
 anytime, with the % weighting attributed towards the next major test.

The following semester grades will be assigned to students in all credit courses.			
	<b>Grade</b>	<b>Definition</b>	<i>Grade Point Equivalent</i>
	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.	

- Your attendance and attention in all classes and your final grade are directly related. A **deduction of 1% per theory hour missed**, will be imposed. (including double periods)
- Any student that is absent for a test, will be required to provide a doctors' note immediately upon returning. Failing to do so will result in a grade of 0% being assigned to the missed test.
- There will be no rewrites for any test written.
- Tests, quizzes and other activities, will not be scheduled on an individual basis, unless it is for a medical or family emergency.
- Disruptions to theory classes, such as lateness, are not acceptable and will be dealt with on an individual basis.

**All required submissions must be in a Duo-Tang cover**

All required submissions will be assessed a late penalty of **5% per day** ( Weekends included ).

**VI. SPECIAL NOTES:**

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.