

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: FLUIDS & COMBUSTION

CODE NO: ELR 211-5 SEMESTER: 3

PROGRAM: INSTRUMENTATION TECHNICIAN

AUTHOR: BRUCE PROUT

DATE: July, 1994 PREVIOUS OUTLINE DATED: N/A

APPROVED: *L. P. Orynth* Date 94-07-07

## FLUIDS & COMBUSTION

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### 1.0 INTRODUCTION

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#### 1.1 Course Objectives

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Hydraulics is widely used as a power and control system for many operations on aircraft. Pilots need to have an understanding of these systems to be proficient with their operation.

This course is intended to provide an basic understanding of hydraulic theory, component operation, circuit design and system troubleshooting.

#### 1.2 Performance Objectives

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Upon successful completion of this course, the student will have demonstrated:

- a) an understanding of hydraulic theory, based on principles of Physics and Fluid Mechanics.
- b) familiarity with terminology and circuit schematics.
- b) knowledge of the components in a hydraulic system, their functions, and operating details.
- c) an understanding of the process of system design.
- d) an ability to specify components required for a simple hydraulic system.
- e) an ability to complete a standard series of lab exercises involving hydraulic circuits.
- f) a basic understanding of circuit troubleshooting techniques.
- g) regular and punctual class attendance and assignment completion.

### 1.3 Course Structure

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- a) Introduction - Background
  - Introduction to Hydraulics
  - Principles of Power Hydraulics
- b) Actuators
- c) Fluids, Reservoirs, Filters
- d) Pumps
- e) Directional Control
- f) Flow Control
- g) Pressure Control
- h) Valve Design and Control
- i) Accessory Equipment
- j) Hydraulic Circuits
- k) Lab Circuit Exercises

### 1.4 Learning Methods

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- a) Topic Discussion
- b) Individual reading and study
- c) Summary notes
- d) Film viewing and analysis
- e) Circuit design
- g) Tests and assignments
- h) Lab exercises

### 1.5 Textbook

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Vickers Industrial Hydraulics Manual

2.0 GRADING  
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2.1 Final Mark  
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Final marks will be compiled in the following way:

Tests .....70%  
Quizzes/Assignments.....30%

2.2 Final Grade  
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Final grade will be assigned according to the final mark as follows:

A+ = 93% - 100%  
A = 85% - 92%  
B = 75% - 84%  
C = 65% - 74%  
I = less than 65%

Notes: Successful completion of all the lab assignments is a requirement for receiving credit for this course.

Students having "I" grades may be given opportunity to repeat one "incomplete" test, one time only. If the revised average is over 65%, the previous "I" grade will be replaced with a "C" grade (65%). If revised final mark is not over 65%, a final "R" grade will be assigned, and the student will be obliged to repeat the course.

Qualification for test re-write opportunity will be a greater than 80% quiz and assignment completion status, and regular class attendance.

A minimum of four written tests are planned throughout the term.

There will at least one week notice provided for each test, to allow for preparation.

Students who will be absent for a scheduled test must contact the instructor in ADVANCE. Students absent without prior notification and a valid reason will be assigned a "ZERO" grade for the missed test.

#### 2.4 Quizzes

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Quizzes will be held without notice, throughout the term. One of the purposes of quizzes is to encourage regular attendance. Students who are absent the day of a quiz will be given a "ZERO" grade, unless the instructor was contacted in ADVANCE. Having a valid reason, the student will be given the opportunity to write the quiz. There will be no "re-writes" for "I" grade quizzes.

#### 2.5 Assignments

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Homework assignments may be given throughout the term. Late or unsubmitted assignments are considered not completed, and will be given a "ZERO" grade, unless PREVIOUS arrangements were made with the instructor.

### 3.0 Classroom Order

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- a) Discussion, questions, and general interaction will be encouraged as positive features of the learning process.
- b) Disruptive conduct is not acceptable.
- c) Other course work or study is not permitted during lecture or lab periods.
- d) Honesty, fairness and respectable treatment of others are basic principles that will govern at all times.

### 4.0 Special Notes

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Students with special needs are encouraged to discuss required accommodations confidentially with the instructor.

In the case of special circumstance, the instructor has the option of modifying guidelines in the course outline.