

I. COURSE DESCRIPTION:

This course introduces the basic principles of fluid mechanics and the application of these principles to practical and applied problems. After completing this course the student should have a firm foundation in the area of Instrumentation, Process Control and fluid systems.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Perform unit conversionsPotential Elements of the Performance:

- Define the terms fluids and fluid mechanics
- Define units of force, energy and pressure in SI and English systems of units
- Perform unit conversions and calculations

2. Define, express and relate the properties of fluids and its lawsPotential Elements of the Performance:

- Pascal's Law – force/area/pressure
- Bernoulli's Law
- Gauge/atmospheric pressures
- Velocity characteristics
- Discuss aeration, cavitation, pump flow

3. Describe basic uses of fluids/gases through Hydraulic/pneumatic systemsPotential Elements of the Performance:

- Understand the functions of fluids in systems
- Be knowledgeable of the various types of fluids used and why
- Understand basic fluid conditioning monitoring needed
- Discuss proper filtering methods and ratings used today
- Discuss proper testing methods available

4. Be knowledgeable in the safety measures used in fluid systems Such as hydraulics and pneumaticsPotential Elements of the Performance:

- List proper safety measures to be used when servicing

hydraulic/

- Pneumatic systems
- Understand how to adjust valves using safe practices
- Be able to safely replace components on any system using safe work habits
- Understand safe lock out practices for systems
- Understand the dangers involved in various types of high pressure hydraulics

5. *Understand basic system components*

Potential Elements of the Performance:

- Reservoirs
- Pumps/Compressors
- Filters
- Directional valves
- Relief valves
- Pressure valves
- Actuators
- Accumulators and other system accessories
- Understand the operation of single and double acting cylinders

6. *Identify factors affecting fluid flow and compute the head loss in a fluid flow system*

Potential Elements of the Performance:

- Characterize laminar and turbulent flow
- Understand frictional head loss
- Understand losses due to expansion, contraction and fittings
- Be able to select sizes and types of hydraulic piping

III. TOPICS:

1. Systems of Units
2. Fluid Properties
3. Fluid/gas function
4. Safety measures
5. Various components
6. Energy losses and Lab activities

IV. REQUIRED RESOURCES/TEXTS/MATERIALS: Handouts will be provided by the instructor.

V. EVALUATION PROCESS/GRADING SYSTEM:

The final grade will be derived from the results of the tests and lab work/assignments, weighted as follows:

Tests - 70%
 Assignments/Lab work - 20%
 Performance/attitude/attendance - 10%

The following semester grades will be assigned to students:

| Grade | <u>Definition</u> | <i>Grade Point Equivalent</i> |
|--------------|--|-------------------------------|
| A+ | 90 – 100% | 4.00 |
| A | 80 – 89% | 3.00 |
| B | 70 - 79% | 2.00 |
| C | 60 - 69% | 1.00 |
| D | 50 – 59% | 0.00 |
| F (Fail) | 49% and below | |
| 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. | |

VI. SPECIAL NOTES: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.

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.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

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

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade "C", (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. 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.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

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.