

I. COURSE DESCRIPTION:

The student will learn about the various procedures and equipment used as well as processes associated with a preventive /predictive maintenance program. Other forms of maintenance programs currently being used will also be examined. Topics include the various approaches to maintenance, vibration and analysis. The student will design and carry out actual maintenance programs on various mechanical equipment.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. *Understand and explain Breakdown Maintenance*

Potential Elements of the Performance:

- Discuss the history of breakdown maintenance
- Explain the disadvantages of breakdown maintenance
- Understand catastrophic failures and their consequences to production
- Understand the cost associated with breakdown maintenance
- Explain why breakdown maintenance is used

2. *Understand and explain Preventative Maintenance*

Potential Elements of the Performance:

- Discuss the history of preventative maintenance
- Explain the advantages of preventative maintenance
- Discuss cost savings to production using preventative maintenance
- Understand the importance of proper planning
- Understand problems associated with Preventative Maintenance
- Understand the importance of using equipment files and record keeping
- Understand the importance of training workers to use preventative maintenance practices properly
- Understanding the importance of having trained skilled trades people

3. *Understand and explain Predictive Maintenance*

Potential Elements of the Performance:

- Discuss the history of Predictive Maintenance
- Discuss the advantages of Predictive Maintenance
- Explain and understand what “prediction” means in

maintenance

- Explain the process of designing a Predictive Maintenance System

4. *Understand and explain Proactive Maintenance*

Potential Elements of the Performance:

- Discuss the make up of a good Proactive Maintenance System
- Discuss various equipment used in Proactive Maintenance
- Discuss monitoring techniques used by production and maintenance
- Discuss root causes of failures in machinery

5. *Explain and understand other maintenance systems*

Potential Elements of the Performance:

- Discuss total productive maintenance
- Discuss preventive engineering
- Discuss reliability engineering
- Discuss productive maintenance

6. *Discuss Vibration Analysis and Balancing*

Potential Elements of the Performance:

- Discuss and understand vibration in machinery
- Explain terminology terms used
- Discuss the cause of vibration
- Discuss the tools used to determine excessive vibration
- Discuss control methods of vibration and equipment used
- Discuss the problems associated with excessive vibration
- Discuss balancing procedures

7. *Discuss various types of inspections used on components*

Potential Elements of the Performance

- Discuss visual inspections
- Discuss types of dyes used and precautions
- Discuss Magnetic Particle Inspection
- Discuss Current inspection
- Discuss Ultrasonic Inspection
- Discuss Radiographic Inspection
- Discuss contamination control
- Discuss Particle Analysis

8. *Explain and understand Laser Alignment Equipment*

Potential Elements of the Performance

- Explain the use of laser alignment equipment

- Discuss the advantages of using modern alignment techniques
- Discuss the problems associated with Alignment procedures

III. TOPICS:

1. Breakdown Maintenance
2. Preventative Maintenance
3. Predictive Maintenance
4. Proactive Maintenance
5. Other Maintenance Available
6. Vibration and Balancing
7. Inspections
8. Laser Alignment

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Millwright manual, Note books, calculator

V. EVALUATION PROCESS/GRADING SYSTEM:

Activities and Assignments 20% Attendance/Attitude 10%
Tests 50% Final Exam 20%
1% deducted from attendance for every inexcusable hour missed from class.

The following semester grades will be assigned to students in postsecondary courses:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
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.

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.