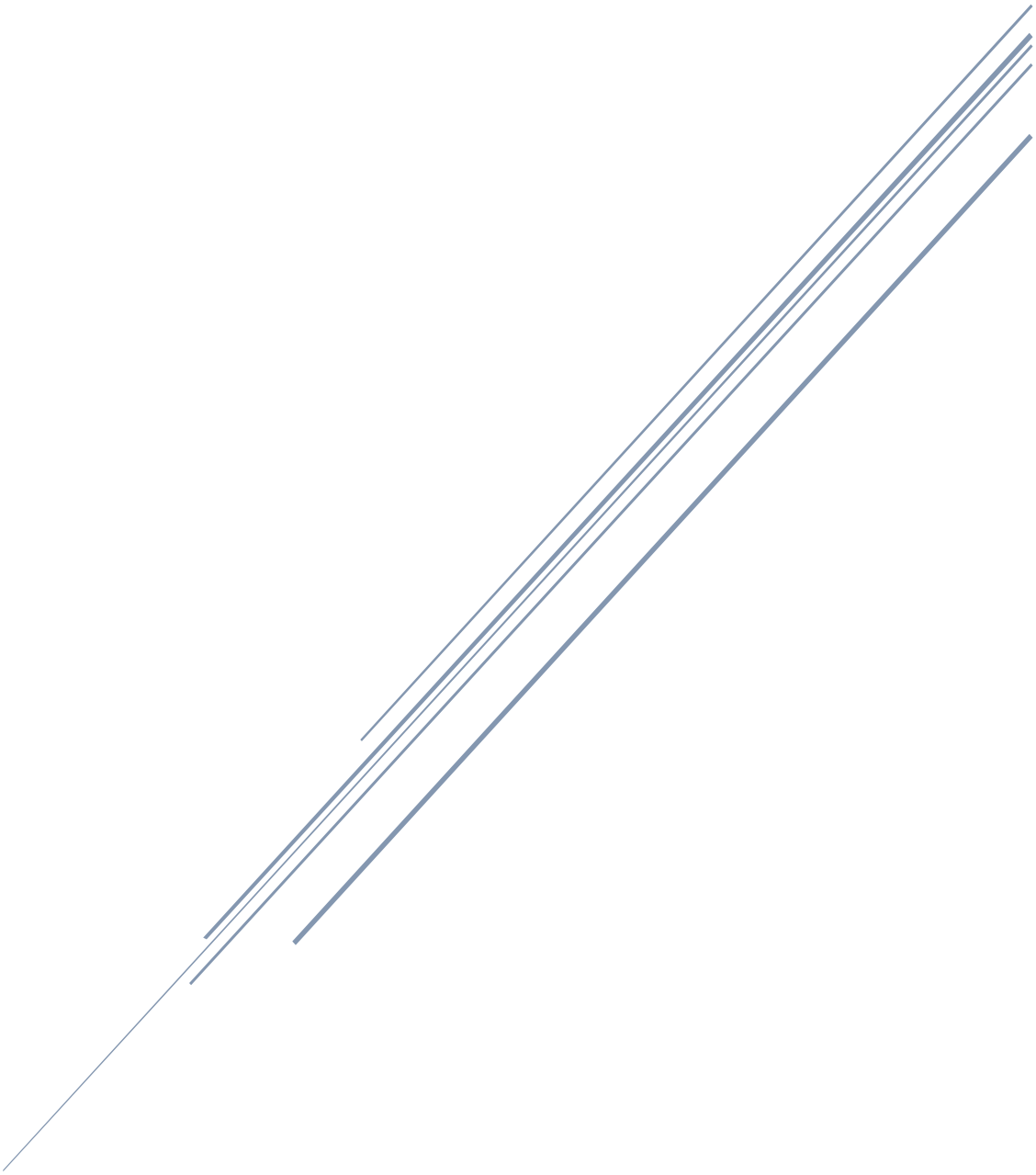
LAB# 11MACLURIN SERIES EXPANSION

CST8233 W2021



ALGONQUIN COLLEGE | to transform hopes and dreams into lifelong success

LAB OBJECTIVE

The objective of this lab is to get familiar with the following:

1- Maclurin series Expansion

Earning

To earn your mark for this lab, each student should finish the lab's requirements within the lab session and demonstrate the working code to the instructor.

STATEMENT OF THE PROBLEM:

Part A

Calculate the Maclaurin Series expansion of f(x) = cos(x) for five terms.
Generalize this result for an infinite number of terms, expressing your solution as a summation.

Show all your steps to your instructor.

Part B

Write a C\C++ program to compute the Maclaurin Series expansion of $f(x) = \cos x$ using the series derived from part A above.

You need to add the terms in the Maclaurin series until the percent relative error falls below a certain pre-specified relative error (%).

Inputs to your program will be x (in radians)) and the pre-specified relative error (%).

Your program should print the number of terms, cos x value obtained along with the true, absolute and relative approximate errors (%).
Your program needs to get the true value of $f(x) = \cos x$ using the built-in $\cos x$ function in C\C++.

Print your result as shown in the sample run.

To Test your code: