<p style="text-align:center">**MEC 320 Programming Assignment III**</p>

<p style="text-align:center">**Due Date: Friday, April 28, 2023, 11:59 PM (Blackboard)**</p>

<p style="text-align:center">**Instructor: Professor Foluso Ladeinde**</p>

<p style="text-align:center">**TA:** Abdullah Sharffudin</p>

INSTRUCTIONS

For your report submission, please copy and paste all your materials for the task into a single Word document. If you have some hand calculations or algebraic manipulations to do before your code begins, please scan or take a high-quality picture with your phone (not blurry) and paste it into the same word document for that task. You will submit only one Word document with all of your results, code, and anything else. Additionally, copy and paste all your codes into 1 m-file and upload that single m-file, even if the codes don't actually run. Please upload your word document and your m-file to Blackboard and remember that you only get one submission attempt so don't upload it until you're done with it, and once you upload it, don't think about it anymore. Points will be taken off if you do not follow these instructions. There are too many of you for everyone to be a special case. I need you to follow these instructions. Without uploading the m-file separately, I can't give you credit for your submission.

Of course, the goal of these Programming Assignments is for you to write your own code, so you are not allowed to use the pre-programmed MATLAB functions like fzero(), integral, or integral2. Your goal should be to code the algorithms yourself.

What I consider cheating: I consider it cheating if you try to pass someone else's work as your own. For example, copy-and-pasting material from any source (for example the internet or your friend) is cheating. With this assignment, I'm asking you to do the tasks. If you don't do it, I will give you a zero. But there is at least dignity in that. You took responsibility for yourself and your shortcomings and were honest about it. But if you don't do the assignment and then try to make me think that you did, I will catch you and report you to the Committee on Academic Standing and Appeals (CASA), and recommend that if you're found guilty, your punishment be to fail the course, which will delay your graduation by a year.

With all that said, if you have trouble or get stuck, you're allowed to consult the book, the internet, your friends, the instructor, the TAs, and so on. As long as, in the end, what you turn in, is your own work. That's how the "learning" process works (1. You're taught something, 2. you try it on your own, 3. if you have questions, you get them answered somehow so that you can finish the work, 4. in the end, you will have learned the material).

Disclaimer: I will run your submissions through two plagiarism checkers, one general plagiarism checker and one specifically designed to check computer codes for similarities.

Before submitting, make sure that all of **the work you turn in** is **your own work**.

Commenting your MATLAB codes will be counted toward your grade. I don't want to see paragraphs of comments – just enough so that it explains to yourself (or to me when grading) what each line or block of code is doing.

THE PROGRAMMING ASSIGNMENT

Problem 24.30 on Page 702 of the textbook for the course, which pertains to the wind force on a skyscraper.

Use Trapezoidal Rule and Simpson 1/3 and compare the results for a comparable number of total panels in the two methods.

Program this problem in MATLAB. (Please do not use any advanced MATLAB functions for this assignment; otherwise, you will be marked wrong.)

In terms of grading, I will be looking for the following:

a) Understanding of the objective(s) of this programming assignment
b) Choice of the correct numerical models for the problems
c) Correct conversion of the mathematical model to numerical model
d) Accurate conversion of numerical model to algorithm
e) Accurate conversion of algorithm to code
f) Obtaining the best possible solutions from the code
g) Great presentation (report writing): Clear and concise writing; organized and easy-to-follow presentation. This means that your report will have a cover, summary, introduction, description of the mathematical/numerical problem, the equations solved, the algorithms fed into MATLAB, the results, discussion of the results, and any concluding remarks, including a discussion of the problems that you have encountered in carrying out this assignment. It should be clear how you set up the problem before you solve it with MATLAB. We usually prefer reports that are typed, as opposed to hand-written ones.

Approximate distribution of points:

A. Introduction, with a description of the engineering relevance of the assignment, and any sketches of the engineering problem – 10 points
B. Objective of the assignment – 5 points
C. Mathematical and numerical approach, number of panels used, accuracy of exact differentiation, etc. – 20 points.
D. Description of the algorithm and pseudocode that is coded in MATLAB – 15 points
E. Accurate completion of the MATLAB code template – 30 points
F. Result presentation – For example, if you choose to use the SIMPLEX method, the tableaus should be presented in a legible, professional format – 10 points
G. Discussion and conclusion – 10 points