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# MECHTRON 2MP3: Programming for Mechatronics

Pedram Pasandide

McMaster University

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## 1 Contact Information

### Instructor

Pedram Pasandide    pasandip@mcmaster.ca

### My Office Hours

Monday      11:20AM - 12:30PM  
Wednesday 11:20AM - 12:30PM  
Thursday    11:20AM - 12:30PM

### Teaching Assistants

Alireza Daeijavad	daeijava@mcmaster.ca	Grad TA
Laeek Ahmed Shaikh	shaikl3@mcmaster.ca	Undergrad TA
Jingze Dai	daij24@mcmaster.ca	Undergrad TA

## 2 Schedule

The course is scheduled from Tuesday, September 5th, to Wednesday, December 6th.

### 2.1 Lectures

### 2.2 Labs

For lab sessions, the subjects covered on Mondays will also be addressed on Wednesdays. Therefore, you are required to attend **either** the Monday **or** Wednesday lab sessions. On Mondays, the lab

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Days	Room	Time
Monday	T13 127	10:30AM - 11:20AM
Wednesday	T13 127	10:30AM - 11:20AM
Thursday	T13 127	10:30AM - 11:20AM

will take place in room **BSB B103**, while on Wednesdays, it will be conducted in room **ABB B118**.

Days	Room	Time
Monday	BSB B103	12:30PM - 1:20PM
Wednesday	ABB B118	11:30AM - 12:20PM

During the lab sessions, we will cover various topics, including Linux installation (not necessary for MacOS users), configuring Visual Studio Code as an Integrated Development Environment (IDE), creating documentation for reports and results, using GitHub, and solving assignment and project-related examples. There will be quizzes during labs which will be discussed later.

### 3 Course Description

The main priority of this course is preserving your mental health! You are going to have lots of sneaky errors, when everything looks perfect. Nothing is worse than seeing the red colour of an error for a programmer compiling the code. But this is the only way you can learn, by debugging! Don't be shy to ask for help.

I'll keep updating the lecture notes on my [GitHub](#). This course provides an introduction to programming, followed by a brief review of working in the Linux (or any Unix based environment) terminal. In the "Fundamentals of C Language" module, students will cover topics such as compiling and executing programs, variable types, and statement structures like loops and if conditions.

The "Intermediate Topics in C" module delves into subjects such as debugging, pointers, and dynamic memory allocation. Moving on to the "Advanced Topics in C" module, students will explore concepts including structs and typedefs, reading a file on C, and write or output the result on a file.

ChatGPT covers the majority of topics addressed in this course, and it is likely to handle a significant portion of the tasks performed by programmers in the near future, as well as creating many new jobs! During this semester, I will emphasize **more advanced topics** in the course. **However, these topics will be optional for students to explore.** One of these optional topics is **Parallel Computing**, which aims to enhance computation speed by utilizing multiple CPUs. Additionally, there will be a brief overview of **Artificial Neural Networks (ANN)** and a demonstration of solving a simple example. It is important to note that this topic is also optional.

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## 3.1 Prerequisites and Antirequisite

### Prerequisites:

- ENGINEER 1D04 or 1P13 or IBEHS 1P10, and
- Registration in a Mechatronics Engineering program

### Antirequisite:

- COMPENG 2SH4
- COMPSCI 2S03
- SFWRENG 2MP3, 2S03

## 3.2 Resources

I have installed [Linux](#) Ubuntu distribution. Students need only read the lecture notes that I'll update every week, and lab notes. If you are interested in more detailed programming in C you may take a look at:

[Prof. Barak Shoshany](#), McMaster University, Lecture Notes for Foundations of Modern Scientific Programming.

## 4 Grading Policy

In this course, we will have a final project which is optional to do. The topic of the final project will be either about ANN or Parallel Computing with 5-10% bonus. So it will be difficult!

**Option 1:** The weights for the final grade without a final project in this course is shown in the following table.

Activity	Score	Weight	Release Week
Assignment 1	10	$10/75 \times 100\%$	4
Assignment 2	15	$15/75 \times 100\%$	7
Assignment 3	20	$20/75 \times 100\%$	10
Six Quizzes during lab sessions	30	$30/75 \times 100\%$	Sep 5 - Dec 6
Total	75	100%	

Quizzes are scheduled to take place during the lab sessions. You will receive advance notice via Avenue a few days before each quiz, informing you of the specific quiz date. These quizzes will be

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conducted online through Avenue and will cover the **basic** topics discussed during our lectures. Remember, you are required to participate in either the Monday or Wednesday tutorial sessions. On Mondays, quizzes will commence promptly at 12:40 PM, and on Wednesdays, quizzes will start at 11:40 AM when scheduled.

**Option 2:** Students who want to do the final project will have the following marking scheme:

Activity	Score	Weight	Release Week
Assignment 1	10	10%	4
Assignment 2	15	15%	7
Assignment 3	25	20%	10
Six Quizzes during lab sessions	30	30%	Sep 5 - Dec 6
Final Project	25	25%	Dec 1 - Dec 15
Total	100	100%	

The final project would be suitable for two groups of students:

- Students who did not receive enough points in other course works, and they would have a chance to redistribute their grade to a final project and possibly having some bonus points.
- Students who have time to explore and learn more about advanced topics, and having feedback about their codes.

If some students chose to do the final project (**Option 2**) and their final grade could be higher by **Option 1**, then what we do is:

1. Including the final project according to the marking scheme "with" final project (**Option 2**).
2. Using the marking scheme "without" a final project (**Option 1**).

**And then we just use the better of the two grades!** In this case you won't need to be worried if you didn't get enough score in the final project.

For the final project, the instructor will select **two topics**, and students can choose one of them. The final project can be completed either **individually** or in a **group of two students**. The topics will be about Parallel computing or ANN, for those students who want to learn more about such topics.

Submissions for assignments and projects must be **original** and written by the students themselves from scratch. If students submit code that has been written by someone else, they will receive a **zero grade** for **academic dishonesty**.

While students are allowed to use **ChatGPT** or any **generative AI**, they **must** acknowledge that they have used it. Additionally, they are required to **understand the meaning** of each line of

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code provided by ChatGPT. There might be a request for an in-person or online presentation from students to explain the code. It is permissible to include a **short code from other sources**, provided the following **conditions** are met:

1. The copied code is **short** and **not the main component** of the project.
2. The **reference** from which the code was copied is included.

The assignments and the final project code **must be written in C** and **should not contain any errors**. An error means I cannot compile and run the code, which technically means a zero grade!

## 4.1 Late Submission Policy

Late submissions would not be accepted. [MSAF](#) must be submitted online.

## 5 Academic Integrity

We expect you to demonstrate honesty and ethical behavior throughout your learning journey. Your academic achievements should be built upon the solid foundation of integrity and honesty. It is essential for you to fully comprehend what actions constitute academic dishonesty. Academic dishonesty refers to knowingly engaging in behaviors that lead to unearned academic credit or unfair advantage. Such actions can have severe repercussions, such as receiving a grade of zero on an assignment, losing credit with a notation on your transcript indicating "Grade of F assigned for academic dishonesty," and even facing suspension or expulsion from the university. To familiarize yourself with the various forms of academic dishonesty, please consult the [Academic Integrity Policy](#). Here, we will highlight three examples of academic dishonesty, though this list is not exhaustive:

1. Plagiarism: This occurs when you submit work that is not your own or that has been obtained from another source without proper credit.
2. Improper collaboration in group work: Collaboration is encouraged, but it is essential to respect the boundaries of appropriate teamwork and avoid crossing into dishonest practices.
3. Copying or using unauthorized aids in tests and examinations: Unauthorized aids, such as cheat sheets or devices, should not be utilized during tests or exams.

Remember, fostering a culture of academic integrity is crucial, and we trust that you will make every effort to uphold these principles throughout your academic journey.

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## 5.1 Plagiarism Detection

In certain courses, there might be the utilization of a web-based service called Turnitin.com, which plays a crucial role in identifying the authenticity and ownership of student-submitted work. Additionally, we may employ Moss, a tool that automatically detects similarities in programming code. Students are expected to electronically submit their work either directly to Turnitin.com or through an online learning platform (such as Avenue to Learn) that supports plagiarism detection. This ensures that the submitted work is thoroughly checked for any signs of academic dishonesty.

For more comprehensive information on McMaster University's usage of Turnitin and its policies, please refer to the Turnitin.com website. In conclusion, it is essential to emphasize that plagiarism has no room for escape. We take academic integrity seriously and are committed to upholding its standards.

## 6 Student Well-being and Code of Conduct

As a strong advocate of student well-being, I deeply resonate with the following quote from my one of my favourite Persian poets:

*Human beings are members of a whole, in creation of one essence and soul. If one member is afflicted with pain, other members uneasy will remain. If you have no sympathy for human pain, the name of human you cannot retain.* Saadi Shirazi (1210-1292 AD)

Please show respect and understanding for your fellow classmates and TAs. “The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as the problem occurs.”