

# High Performance Computing and Parallel Programming: ACM40640/PH504

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# General Overview

The goal is to gain understanding of different parallel programming paradigms as well as understanding different HPC architectures using best practice.

Working knowledge of either C or Fortran programming language is required for this module.

## Lectures:

The lectures are all video recorded. There are between **30-40 minutes of pre-recorded lecture materials** available each week, with accompanying pdfs

You can watch these in your own time throughout the week.

## Practicals:

There will be a practical of the week to complete before the next week's Q&A sessions.

## Q&A Sessions:

Q&A session: **Tuesday 11am-1pm** covering the previous week's practical. The practicals will be covered in a live coding session, however if there are any other questions, please post them in the forums so we can answer/cover them.

# General Overview

There will be two Virtual Office hours. New Zoom link will be shared.

## Assessment:

Assignments (70% total grade, 35% each): There will be 2 assignments spread over the course, which need to be uploaded to Brightspace/Blackboard. The normal rules governing plagiarism apply. Remember to comment your code!

Assignment 1: Tuesday 21<sup>st</sup> February → Tuesday March 28<sup>th</sup>

Assignment 2: Tuesday 28<sup>th</sup> March → Tuesday April 18<sup>th</sup>

Exam (30% total grade)

Tuesday 25<sup>th</sup> April (3 hours to complete)

Due to widespread of participating students across multiple universities, all Q&A sessions will be held online. Exam will be held online.

Week#	Tuesday Date	Q&A Session	Deadlines	Topic
1	24 <sup>th</sup> Jan, 11am	Intro session		Introduction to HPC and HPC Architectures
2	31 <sup>st</sup> Jan, 11am	practical 1		Parallel Performance and Programming Models
3	7 <sup>th</sup> Feb, 11am	practical 2		Introduction to OpenMP
4	14 <sup>th</sup> Feb, 11am	practical 3		OpenMP Loop and Synchronisation Constructs
5	21 <sup>st</sup> Feb, 11am	practical 4	Assignment1 released	OpenMP versions after 2.5
<b>VIRTUAL OFFICE:</b> 24 <sup>th</sup> Feb Friday, 11am-12pm				
6	28 <sup>th</sup> Feb, 11am	practical 5		Introduction to MPI
7	7 <sup>th</sup> Mar, 11am	practical 6		MPI Point to Point Communication
<b>TWO WEEKS BREAK</b>				
8	28 <sup>th</sup> Mar, 11am	practical 7	Assignment1 due 5:30pm Assignment2 released	MPI Collective Communication
<b>VIRTUAL OFFICE:</b> 30 <sup>th</sup> Mar Thursday, 11am-12pm				
9	4 <sup>th</sup> April, 11am	practical 8		MPI Communicators and Virtual Topologies
10	11 <sup>th</sup> April, 11am	practical 9, 10		MPI Derived Datatypes
	18 <sup>th</sup> April		Assignment2 due 5:30pm	
<b>FINAL EXAM:</b> 25/04/2023 Tuesday 11am-2pm				

# Logging into sciprog

A successful login will appear as the following

Watch How to SSH recording for login information

Your passwords will not appear as you type

Ensure that your new password is longer than 20 characters

Username available in  
Usernames.pdf on  
Brightspace/Blackboard

NB: Your assignments, exams will be marked on sciprog, so ensure that all submitted material can be compiled and run on sciprog

```
Chris-MBP-5:~ chris$ ssh sp1@sciprog.ichec.ie
sp1@sciprog.ichec.ie's password:
You are required to change your password immediately (root enforced)
WARNING: Your password has expired.
You must change your password now and login again!
Changing password for user sp1.
Changing password for sp1.
(current) UNIX password:
New password:
BAD PASSWORD: The password is shorter than 20 characters
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
Connection to sciprog.ichec.ie closed.
Chris-MBP-5:~ chris$
Chris-MBP-5:~ chris$
Chris-MBP-5:~ chris$ ssh sp1@sciprog.ichec.ie
sp1@sciprog.ichec.ie's password:
Last login: Fri Sep 25 14:45:23 2020 from glasnost.ichec.ie
[sp1@sciprog ~]$
```

# For any update/queries:

Announcements on Blackboard/Brightspace

Discussion Forum on Blackboard/Brightspace

Emails:

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[jake.williams@ucdconnect.ie](mailto:jake.williams@ucdconnect.ie)