# Robotics Masters - Capstone 2020

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Dear Students,

Thank you everyone for reaching out this week and organising kick off meetings. I have recieved communication from all teams now. I have met with some of you already which is great. It is going to be a very fun semester working with you all on these interesting and useful projects.

I wanted to clarify some administration information before we get fully underway. This should ease your concerns about expectations throughout the semester. Please read carefully and let me know if you have any problems. The information is quite dense.

First off, please make sure you CC or include both my email addresses when communicating. They are: cian@roboticsmasters.co; cian.byrne@coliemore.com.au . I could be sending from either.

**Summary**:

- Weekly Zoom Meetings
- Alternative Communication Groups
- Week 2 & 3 Work Expectations
- Project Requirements Document

## Weekly Zoom Meetings

The first weekly meetings will start on 14 September. There will be no weekly meetings during week 3. There will be no individual video updates for the first meeting (see below).

Every team is doing a meeting at the start and end of the week via Zoom - two client meetings per week. If your team is yet to decide on a time for your meeting, please do so before the end of this week. Slots are avaiable here: https://github.com/wallarug/capstone2020. I will be setting up each of the meetings over the weekend on my zoom account.

For the meetings on Monday/Tuesday, every *individual* team member is expected to present a pre-recorded 1-minute video update on what they have contributed for the week. These videos will be presented in the first 5 - 10 minutes of every zoom meeting and then are to be incorporated into your individual report component of the assessment. These updates will help me track how everyone is going with the project and help address any issues throughout the semester.

### Zoom Meeting Format

1. Video Updates *(Monday/Tuesday only)*
2. Any challenges faced throughout the week
3. Questions - both technical and/or requirement clarifcation.
4. Plan for next 'sprint' or until next meeting (what do you plan on achiving/completing?) and which team member is responsible for each task. This will make up a significant component of the group report assessment - ultimately saving you time later on).

## Alternative Communication Groups

We will also be using the below platforms throughout the semester. Please ensure you are signed up to the Discord Server ASAP.

1. **Venture Café** - https://venturecafesydney.org/ is held online every Thursday afternoon from 4:00 PM to 8:00 PM. It is an online meeting where different creators, startup owners meet and discuss what they are doing with their own projects. It works like a 'drop in session' where people may only join for 15 minutes or could stay for longer. We will be sharing your progress and discoveries through this platform. Your team will be required to attend some of these sessions at a dates to be determined later. You are welcome to attend Venture Cafe on any Thursday to get a feel for the platform and chat with other technology people.
2. **Discord** – we will be collaborating/discussing/sharing ideas with teams run by Ben Sand (another client). Just to be clear, they are doing completely different projects unrelated to your project. There is a total of 15 capstone teams taking part in this initiative. We have done this kind of collaboration before and it has been very positive for students and opens up a number of different opportunities, such as meeting tech influencers, established developers and other technology specialists. Please sign up to the Discord channel (**https://discord.gg/wqUHd2**) and change your name to the group code and your name (as per everyone else).

## Week 2 & 3 Work Expectations

As we are not meeting in Week 3, I have outlined the work to be completed for all teams below.

1. **Set Up Simulator -** All teams this semester are working with simulation technologies. The expectation for the next two weeks is that each team is able to pick a simulator and set it up on all your team's computers.
2. **Paperwork -** In addition to setting up the simulators, please ensure you have completed all paperwork that the university has sent you. This may include a copyright form and a team declaration. Confirm this with your tutors if unsure.
3. **BitBucket Repo -** Please also set up your BitBucket repositories to be ready for development and include me on your repository. Add me by email using cian.byrne@hotmail.com to link with my existing account.
4. **Other** - discussed in kick-off meetings and emails to individual teams

**Donkey Car & Autonomous Car Teams**

For the teams working with Donkey Car, you will be using the Unity based simulator that has multiple parts listed below. We need all parts to be working for Week 3 as the first stage of this project is to expand on the simulator and create a new world / track with extra elements. You will need to install Unity as well. I will be sending out the new track layout and signs/objects for detection to be created and imported into the donkey car simulator at the start of Week 3. Feel free to start experimenting with the simulator and see what you can do with adding new tracks and objects.

Docs: http://docs.donkeycar.com/guide/simulator/
Docs 2: https://www.hackster.io/wallarug/donkey-car-simulator-with-real-rc-controller-628e77
Repo 1: https://github.com/tawnkramer/gym-donkeycar
Repo 2: https://github.com/tawnkramer/sdsandbox

I strongly encourage you to join the Donkey Car Discord Channel (https://discord.gg/PN6kFeA) immediately for assistance with any problems you encounter throughout the semester. There are over 3000 people waiting to help you with any problems that you have. Check out the #simulation channel for all simulator related questions.

The plan at the end of the unit is that all teams will compete against each other in an online challenge event. We will have one event in Week 7 and another in Week 11. We will have an additional competition with the rest of the world in October & November at the world-wide Donkey Car Racing League, more information later. Teams will be competing for honour and glory!

**Drone Teams**
For the teams working with drone technologies, there are a number of different simulators. I would prefer that everyone uses the same simulator, however, I am aware that the drone simulators are platform specific. I have researched a few different options already but will leave it up to each team to make a final decision. AirSim seems like the most practical solution for cross-platform, cross-library support but requires a lot of processing power. Gazebo (Linux/Mac) and jMAVLink (cross-platform) have the most documentation. Please research the best option and let me know which platform your team plans on using. The simulator you select must meet the below specifications:

- Supported by ArduPilot and/or PX4 Firmware Libraries
- Ability to customise the algorithms in the simulator (not just fly a coper around)
- Ability to support multiple vechiles at the same time
- Run on your computers for demos

Docs for ArduPilot Simulators: https://ardupilot.org/dev/docs/simulation-2.html
Docs for PX4 Simulators: https://dev.px4.io/v1.9.0/en/simulation/

I strongly encourage you to join the ArduPilot and PX4 Community groups (listed below) for support with the simulation technologies. These people are experts in their field and can provide really helpful feedback to challenging problems.

Facebook: https://www.facebook.com/groups/aurdupilotgroup
Forums: ArduPilot: https://discuss.ardupilot.org/ PX4: https://discuss.px4.io/
Gitter: https://gitter.im/ArduPilot/ardupilot

Please report back which simulator your team is going to be using this semester ASAP.

## Project Requirements Document

I will be sending each team a specific outline of the project requirements, with individual goals to meet, over the weekend. This document will outline what the expectations and tasks are for the project you are completing. I would like to mention, there is flexibility on achiving the requirements - be creative and research the different ways that you can complete a particular task. I will be a 'happy client' as long as you can meet the expectations and requirements.

I needed a little extra time and to meeting with teams to ensure that each of the requirements is taylored to your individual team (as not all teams have the same number of people). Thank you for your patience while these are prepared. I will get these out to everyone ASAP.

One final note, remember to have fun during this project! All the activities I put forward throughout this semester are designed to give you the best experience and real-world skills to take going forward in your careers. This unit is about learning as much as you can about different areas of Computer Science, Engineering and IT that you would not normally study or experience. Capstone is one of the most flexible units and can be one of the most enjoyable. Ask lots of questions in different groups and online, do lots of research and reading on each topic to understand it fully. Get as much as you can out of this process as you can!

I am here to help out as much as I can.  Feel free to message me on Discord (Join: https://discord.gg/PN6kFeA) or via email.

Thank you again and I am looking forward to seeing what we can achive together this semester.

Kind Regards,

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