Introductory Session

This course intend to make you capable of communicating drones with programs written by you. We are going to follow C++ as it is the fundamental and well known programming language. Also we are going to control a Quadcopter. OS we going to work is Ubuntu 18.04.
Before directly controlling a drone, we should test our code is working perfectly or not or to identify the flaws in it. This we can achieve by running a simulation.

1. We need to setup a virtual drone.
2. We need to establish some connection between drone and program.

A simulation requires a virtual Pixhawk(Flight Controller) so that to make it respond similar to the original one, and a model of the drone with an environment so we can actually observe what are the impacts of our program.
Inorder to do this we need to install some softwares:

1. Setting up an SITL : SITL allows you to have a virtual flight controller attached to a 3 D modelled vehicle. So that we can observe the impacts.
2. Gazebo Simulation : Our club is following gazebo as its standard simulator. It is a light weight simulator where we can observe what all are happening to the drone with less CPU usage compared to others. Drone model can be imported during installation.

Now our drone is set up in simulation which is fully functional. Now we need to establish a connection. This can be done by ROS.
ROS have a subdivision called MAVROS , which converts all commands in our program into messages(Mavlink messages) that can be interpreted by the FC (Flight Controller) to perform a task. These messages are transmitted to SITL on running the code as we can define which port the messages have to be transmitted(Each computer has its own port ID).
So the flow is like this:
In simulation
Program -> Mavros -> Mavlink Messages -> SITL -> Drone in simulation environment.
In real drone
Program -> Mavros -> Mavlink Messages -> Pixhawk -> Drone movements.
So first we need to install and make our Laptop compatible for this.
Task 1 : Installation of Ubuntu. Follow the instructions given in this link :
https://www.itzgeek.com/how-tos/linux/ubuntu-how-tos/how-to-install-ubuntu-18-04-alongside-with-windows-10-or-8-in-dual-boot.html
Run rufus as per the instructions.
https://ubuntu.com/tutorials/tutorial-create-a-usb-stick-on-windows#4-boot-selection-and-partition-scheme
Ubuntu enables various commands in the terminal to perform various action.
Terminal is similar to command prompt/powershell in windows but in Ubuntu it gives us the power to access everything much easier. CTRL+ALT+T to open a new terminal.
https://techlog360.com/basic-ubuntu-commands-terminal-shortcuts-linux-beginner/
Check this site to get some of the important commands.

Play around in ubuntu with all those commands and explore new commands like git clone etc.. and think of the flow of control. Next installation step and task in next session.