ID:	**JP16-01**
SUPERVISOR:	Justin Pead
TITLE:	Investigating and Optimizing an Open Source Electronic Speed Controller (H Bridge) to determining its suitability for robotic applications
DESCRIPTION:	Simple Speed controllers are all over the internet, Some enthusiasts have produced their own optimized versions. The website *vedder.se* has one such design. The primary aim is to investigate the potential of using this Open Source systems in Research applications. In research, there are typically two possible requirements: full control and optimisation on the low level device. (Torque Control, Position Control, Velocity Control, Acceleration Control) or A black box that works all the time. This bridge needs to be tested in both regards to see whether it could be used on upcoming robotic platforms.
DELIVERABLES:	• Assemble and test the open source device functionality. • Produce a test structure for the circuit and provide technical test data to allow for similar modules on the market. • *Improve on the design (Either Electronically, or through software)
SKILLS/REQUIREMENTS:	Electronics / Embedded Systems
ELO3: Engineering Design Perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes.	*Design of Testing Apparatus + Testing routine to quantify performance* *Potential Improvements based on testing.*
EXTRA INFORMATION:	Completing the minimum for this topic would not achieve a 1st. One would need to creatively think of optimisations, testing for that, and implantation of improvements if you were seeking a higher grade.
AREA:	Electronics / Embedded Systems

ID:	**JP16-02**
SUPERVISOR:	Justin Pead
TITLE:	Design of a White Lab Component Vending Machine
DESCRIPTION:	The UCT component store cannot stay open 24/7 however students would appreciate if they could get access to components on request. Most student requests can be solved by providing a small subset of components. A modular machine may be a solution to late night component queries.
DELIVERABLES:	• Mechanical Design of a component Dispenser for different sizes • Electronics capable of counting, logging and dispenses components • *Create it in a modular fashion to be extendable as student requirements increase
SKILLS/REQUIREMENTS:	Some Mechanical Design, Electronics, Embedded Systems
ELO3: Engineering Design Perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes.	*Mechanical and Electrical Design of Vending Machine modules, Testing for system and potential improvements if time allows.*
EXTRA INFORMATION:	
AREA:	Electronics / Embedded Systems

ID:	**JP16-03**
SUPERVISOR:	Justin Pead
TITLE:	Quadcopter Motor Dynamic Balancing Rig
DESCRIPTION:	Typically Quadcopter propellers are balanced statically, however when they are spun up on a motor the potential for dynamic instability on the pair still exists. Treating a motor and propeller as one and balance the motor/prop pair dynamically would improve the motor bearing life and reduce the sensor noise on flying platforms
DELIVERABLES:	• Design a mechanical motor rig capable of oscillating without falling apart • Design and implement a sensor solution that is able to model the motor motion • Predict where the dynamic unbalance is in the system • Make recommendations to fix the unbalance for the pair
SKILLS/REQUIREMENTS:	Some Mechanical Design, Electronics, Embedded Systems
ELO3: Engineering Design Perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes.	*(Mechanical and Electrical Design of machine modules, Testing for system and potential improvements if time allows.*
EXTRA INFORMATION:	
AREA:	Electronics / Embedded Systems