



WEEF PROPOSALS

SUMMARY

S2020



Academic Equipment and Resources		
Proposal Title		Requested
Lightboards for online teaching, S-82		\$ 1,520.00
Ultimaker 3D printer and Discov3ry Complete systems for student use, S-83		\$ 9,655.38
Upgraded Robotic Manipulators, S-84		\$ 15,000.00
Magnetic Gear Pump for Undergraduate Teaching Lab, S-85		\$ 6,215.00
Acquisition of a Computerized Chemical Reactor for Undergraduate Teaching Lab, S-86		\$ 50,878.00
New Prototyping Workshop (Part 2), S-87		\$ 12,782.80
CHE180 Remote IDEAS Activitiy, S-88		\$ 7,500.00
Ideas Clinic - Life Cycle Testing, S-92		\$ 8,000.00
Design+Fabrication Lab 3D Clay Printing Processing Equipment, S-93		\$ 8,500.00
New HVAC Lab Rig, S-96		\$ 7,000.00
Proteus VSM: An Alternative for Electrical and Computer Engineering Laboratories in Times of COVID-19, S-101		\$ 28,954.00
New Computers for the Musagetes Library, S-102		\$ 19,892.36
Engineering Orientation - Let's make OWeek Great! S-104		\$ 450.00
Total		\$ 176,347.54
Student Teams		
Concrete Design Team – Spring 2020, S-89		\$ 2,975.00
VEX U Robotics 2020 Spring, S-90		\$ 1,660.00
2021 Season, S-91		\$ 7,822.00
Mini-submarine Components, S-94		\$ 1,645.00
Spring 2020 WATonomous Funding Proposal, S-95		\$ 1,913.00
Waterloo Formula Electric Funds Proposal Spring 2020, S-97		\$ 7,160.00
WEEF Proposal Spring 2020, S-98		\$ 3,307.00
Midnight Sun Hardware Component Funding, S-99		\$ 10,750.00
Kraken of The Sky, S-100		\$ 7,500.00
Completing the Goose 5 project, S-103		\$ 2,400.00
Total		\$ 47,132.00



Lightboards for online teaching

Civil and Environmental Engineering
ENVE 223,224,275,375; CIVE204,224,303,341,460; likely others
James Craig, Associate Professor
jrcraig@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

5+ years.

The base lightboards will easily last 10 years or more with periodic replacement of electrical components.

Implementation Schedule

Finalization by mid-August 2020 of first lightboard. Second built afterwards in mid-F'20 once all kinks are worked out. Intended to support teaching in F'20.

Additional Information

The CEE department has already secured space in CPH-3376 for the first lightboard and camera setup; it is separately supporting purchase of the video editing software (~\$350) and providing on-site computer for video editing (~\$1500). CEE will handle any o

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Plexiglass and frame (\$200 x 2= 400)	400	200	200	0
Backdrop and backdrop stand (\$90 x 2 = 180)	180	90	0	0
Umbrella Lighting Kit & LED Strips (\$230 x 2 = \$460)	460	230	0	0

Academic Equipment and Resources

Proposal S-82



Dedicated Web Cam with Tripod; separate microphone behind board (\$200 x 2 = \$400)	400	200	0	0
special neon glass markers and cleaner (\$40 x 2 = \$80)	80	40	0	0
Total	1520	760	200	0



Ultimaker 3D printer and Discov3ry Complete systems for student use

Nanotechnology Engineering Undergraduate Labs
 NE 100, NE 220L, NE 408, NE 409
 Jenn Coggan
 jcoggan@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

We hope to get ~10 years of lifetime from this equipment

Implementation Schedule

Immediate

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
two Ultimaker3 printers and one Ultimaker 2+Discov3ry Complete systems	9655.38	3761.99	3085.80	0.00
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	9655.379999999992	3761.9899999999998	3085.8000000000002	0



Upgraded Robotic Manipulators

Mechanical and Mechatronics Engineering

ME 547

Eugene Li, Mechatronics Engineer in Training

eugene.li@uwaterloo.ca

Description of Proposal

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Proposal Benefits

0

Estimated Equipment Lifetime

The specified robot is intended to work continuously for 10 years with minimal maintenance. We expect with our more limited implementation that it will be in use for 15-20 years.

Implementation Schedule

The first QArm has already been purchased and is ready for implementation as soon as campus access is restored. If funding is provided the second arm could be purchased right away and also installed.

Additional Information

Additional hardware discounts may be available due to the COVID-19 situation

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Quanser QArm	15000	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	15000	0	0	0



Magnetic Gear Pump for Undergraduate Teaching Lab

Chemical Engineering

ChE390, ChE 490, ChE491

John Zhang, Senior Laboratory Instructor/Manager

m78zhang@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The equipment in this purchase has proven quality in our lab and should serve our undergraduate teaching purposes for many years to come.

Implementation Schedule

The equipment can be assembled and tested as soon as they are available and will be ready for the laboratory courses in the Spring term of 2021.

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Magnetic Gear Pump	6215.00	6215.00	6215.00	6215.00
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	6215	6215	6215	6215



Acquisition of a Computerized Chemical Reactor for Undergraduate Teaching Lab

Chemical Engineering
ChE490, ChE491

John Zhang, Senior Laboratory Instructor/Manager
m78zhang@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

Multiple sets of equipment from the same manufacturer in our lab have proven the quality of this unit and it should serve our teaching purposes for many years to come.

Implementation Schedule

The equipment can be assembled and tested as soon as they are available and will be ready for the laboratory courses in the Fall term of 2021.

Additional Information

Our department has invested and purchased some downstream equipment such as viscometer, tensile machine, and DSC for the project of hydrogel synthesis and characterization, so we greatly appreciate it if WEEF can cover the cost of this essential reactor u

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
REA/3000 Computerized Chemical Reactor	50256.00	50256.00	50256.00	50256.00
Shipping and Handling	622.00	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	50878	50256	50256	50256



New Prototyping Workshop (Part 2)

Systems Design Engineering (SYDE & BME)

SYDE 263L, BME 261

Chris McClellan, Design Instructor

chris.mcclellan@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

10+ years

Implementation Schedule

ASAP

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Electronics Suite	12782.80	6391.40	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	12782.7999999999 999	6391.3999999999 99996	0	0



CHE180 Remote IDEAS Activitiy

Chemical Engineering
CHE 180
Jason Grove, Lecturer
jagrove@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

1 yr

Implementation Schedule

Fall 2020

Additional Information

We will be exploring options to get materials to students. For example, it may be easier to ship students gift cards and have them purchase the equipment themselves.

Approx 150 students x estimated \$40-50 per student

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Soap-making consumables	7500	6000	4500	3000
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	7500	6000	4500	3000



Ideas Clinic - Life Cycle Testing

Engineering Ideas Clinic
SYDE 285 for pilot offering; more to follow.
Chris Rennick, Engineering Educational Developer
crennick@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

We expect a life of 5+ years from this equipment.

Implementation Schedule

The equipment will be purchased as soon as funding is granted. Development began in January 2020. Discussions are currently underway to pilot this activity in SYDE 285 in winter 2021.

Additional Information

The Engineering Ideas Clinic will match the contribution from WEEF dollar for dollar. The Ideas Clinic is also providing all the labour (co-op students, grad students, and connections to industry) to develop this platform. The Ideas Clinic and Microsoft

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Actuators - \$250 per machine	2000	250	0	0
Structural frames - \$250 per machine	2000	250	0	0
Instrumentation (strain gauges, etc) - \$500 per machine	4000	500	0	0
0	0	0	0	0
0	0	0	0	0
Total	8000	1000	0	0



Design+Fabrication Lab 3D Clay Printing Processing Equipment

Architecture

arch684, arch570

Heinz Koller, Fabrication Lab Manager

hkoller@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

10 years min.

Implementation Schedule

immediate upon aquisition

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Shimpo Pug Mill NVA-04S	8500	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	8500	0	0	0



New HVAC Lab Rig

MME and CEE (Arch E)
ME599/CIVE497/ME760
David Mather, Lecturer
dwmather@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

15+ years

Implementation Schedule

Purchase: late 2020

Arrival at UW: mid-2021

Installation/testing: mid-to-late 2021

Initial teaching use: Winter 2022

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
New HVAC Lab Rig	7000	5000	4000	3000
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	7000	5000	4000	3000



Proteus VSM: An Alternative for Electrical and Computer Engineering Laboratories in Times of COVID-19.

ECE/Laboratory Instructors

This project will benefit at least the following courses: ECE-140, ECE-222, ECE-222SE, ECE-224, ECE-240, ECE-298, NE-140, NE-241

Reinier Torres Labrada

rtorresl@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

One year for the initial license package with expected renewal at lower cost in subsequent years. Further renewal will be determined based on need, student feedback, and demonstrated benefit to our student community.

Implementation Schedule

We will start introducing the software starting in the Fall term with at least ECE-222. More courses are expected to introduce the software during Winter and Spring of 2021. If COVID-19 effects stop impacting the normal development of labs we may not exte

Additional Information

During the first iteration of this project, several members of the ECE Laboratory Instructors team will be involved in using Proteus VSM in our classroom: Reinier Torres, Marco Iskander, Eric Praetzel, David Bell, John Saad, and Kim Pope.

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Proteus Virtual System Modelling (VSM) Includes: Advanced Simulation/PIC16/ARM Cortex M4	18000	19500	26500	28954
0	0	0	0	0

Academic Equipment and Resources

Proposal S-101



0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	18000	19500	26500	28954



New Computers for the Musagetes Library

Architecture

0

Alfredo Sordo Client Support Specialist

asordo@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The estimated lifetime of the equipment would be around 5 years.

Implementation Schedule

The implementation schedule would be in the fall or basically whenever we will be back at the school.

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
8 new computers for the Musagetes library.	12755.44	11186.05	14587.17	19892.36
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	12755.440000000 001	11186.0499999 99999	14587.17	19892.3600000 00001



Engineering Orientation - Let's make OWeek Great!

Engineering Orientation

0

Kristopher Sousa

engoteam@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The life expectancy for the photo mosaic download is one time use, but it will last forever for any first years or leaders who choose to look back on this unique orientation week experience.

We expect a life expectancy of 5+ years for the monitor and Mine

Implementation Schedule

The photo mosaic will be purchased in the month of September, following the photo submissions from first year students.

The monitor will be purchased as soon as funding is granted. It will be installed in the Engineering Orientation Team office once acces

Additional Information

If we receive any funding, we will:

- Add the WEFF logo on our website and social media platforms
- Link to the WEFF website on the Engineering Orientation website and social media platforms as well as a thank you post on our social media
- Recognition on

Cost Breakdown

Academic Equipment and Resources

Proposal S-104



Item	Option 1	Option 2	Option 3	Option 4
Photo mosaic download	55	55	55	55
Monitor	150	150	150	0
4x Minecraft Licenses for O-Team	108	108	0	0
Kahoot	55	0	0	0
Minecraft Server Hosting	82	0	0	0
Total	450	313	205	55



Concrete Design Team – Spring 2020

University of Waterloo Concrete Canoe and Toboggan
0

Concrete Design Team - Spring 2020
uwconcreteteam@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

Reusable respirators – 5 year

Neck guards – 5 year

Mouthguards – 1 year

Anti-slip ice grippers – 10 years

Bench-scale – 15 years

Implementation Schedule

All these items will be purchased as soon as possible. We are currently waiting for the school to re-open and the approval for student design teams to commence their work.

Additional Information

BRONZE LEVEL:

Up to \$500-\$999 in sponsorship. The company's name and logo will appear on the team website and Facebook page.

SILVER LEVEL:

From \$1500 to \$1999 in sponsorship. In addition to the Bronze level benefits, Silver level sponsorship also include

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
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Student Team
Proposal S-89



Reusable Respirators	390.00	420.00	450.00	460.00
Neck Guards	90.00	70.00	100.00	120.00
Mouth Guards	50.00	40.00	66.00	65.00
Anti-slip Ice Grippers	300.00	190.00	0	0
Bench Scale	2030.00	1900.59	0	0
Total	2860	2620.59000000 00001	866	795



VEX U Robotics 2020 Spring

VEX U Robotics
0

Alex Su, Electrical Lead
alex.su@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

At first glance, the initial start-up cost for a VEX U team is high. However, it soon becomes clear that the majority of this cost exists because it is our first year. Past the first year, there is minimal recurring cost, with only a few hundred dollars r

Implementation Schedule

The requested funding will be used very soon after it is allocated.

Additional Information

More information about the items we are requesting funding for:

3D printer enables us to prototype with different designs without the need to machine/lathe.

Anti-Static Field Tiles are what the robot is driven on, similiar to the carpet used in FRC compet

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
3D printer	1000	900	800	700
Anti-Static Field Tiles	400	360	300	250
VEX Field Controller Kit	260	200	150	100
0	0	0	0	0
0	0	0	0	0
Total	1660	1460	1250	1050



2021 Season

University of Waterloo Formula Motorsports

0

Sam Swift, Project Manager

seswift@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

It is rules mandated to build a new chassis each year but the chassis tubes are still able to be reused for testing. The control arm tubes can be reused in their entirety so have a useful life of 1-2 years. 2018 control arms were used on the 2019 car for

Implementation Schedule

Some items will be purchased over the summer such as I2 Pro. However, many of the items such as the chassis tubes need design to be finalized and will be purchased near the end of the fall term. All of these items if funded will start to be utilized in th

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Chassis & Control Arm Tubes	4500	4500	4500	500
Rod Ends & Spherical Bearings & ¾" Apex U-Joints	1700	450	0	1700
Motec I2 Pro	650	0	0	0
Brake Pads	272	272	0	0
PCB Components & Strain Gauges	700	700	0	0
Total	7822	5922	4500	3172



Mini-submarine Components

Waterloo Aquadrone Student Design Team
0

Amaar Quadri, Mechanical Design Lead/Captian
aquadri@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The vast majority of the equipment that will be purchased will be useful throughout the life of our team. Every component being purchased will be used throughout until the competition in 2021, and likely beyond that as well for future competitions. This e

Implementation Schedule

The design phase will continue until the end of the summer. All the components will aim to be purchased during the summer, and in the first few weeks of the Fall term. All applicable social distancing guidelines will be followed throughout.

Additional Information

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Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Mechanical Components (Waterproof Enclosure, Packaging, Propulsion System, Ballast, Epoxy, etc.)	520	500	480	450
Electrical Components (Control Board, Cameras, Power Source, Electrically actuated valves, etc.)	300	275	250	0

Student Team
Proposal S-94



Inter-Vehicle Communication (Acoustic Transducers, Acoustic Receivers, etc.)	175	160	150	0
NVIDIA Xavier NX Developer Board	650	0	0	0
0	0	0	0	0
Total	1645	935	880	450



Spring 2020 WATonomous Funding Proposal

WATonomous

N/A

Sadaf Anwar, Business Director

sadaf.anwar@watonomous.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

All of the requested items will be used throughout the remainder of Year 3's challenge and during Year 4 of the competition. If there is no successor competition, some of the materials can be donated to the other student design team. This would cut down c

Implementation Schedule

Equipment is to be purchased in the Spring/Fall 2020 term to use for Year 3 challenge requirements.

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Materials for mounting equipment and electrical controllers	500	250	0	0
Wooden crate - Needed to transport and carry equipment to the competition(https://www.uline.ca/BL_441/Heavy-Duty-Wood-Crates)	1413	1137	1069	612
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Student Team
Proposal S-95



Total	1913	1387	1069	612
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Waterloo Formula Electric Funds Proposal Spring 2020

Waterloo Formula Electric
0

Bao Anh Nguyen - Team Lead
ba2nguye@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The battery cells should last for the lifetime of our car, about a year, and could be reused and repurposed toward the next iterations of our vehicle. Expected degradation over estimate charge-discharge cycles is very low.

The spot welder should last for

Implementation Schedule

Due to the uncertain circumstances surrounding the COVID-19 pandemic, we are unable to provide a definitive date as to when we will be able to order and utilize any items that WEEF chooses to fund as a result of this proposal. That said, once it is safe t

Additional Information

Our team understands the benefit of sharing and collaboration between UWaterloo design teams, as well as the practical redundancies of having multiple similar products throughout the SDC. As such, our team would be willing to share these tools with simila

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
"18650" Battery Cells	6100	6100	4750	3500
Cell Spot Welder	400	400	400	200
Wiring Harness Tool	300	0	0	0
Heat Gun Station	360	0	0	0
0	0	0	0	0
Total	7160	6500	5150	3700

Student Team

Proposal S-98



WEEF Proposal Spring 2020

UW Robotics Team

0

Daniel Dudziak - Finance/Business Lead

dddudzia@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

Electrical Components/Tools:

- Reflow Oven will last for 4 years
- Crimping Tools will last for 5+ years
- Oscilloscope will last for 4 years
- Solder Paste Syringe will last for 1 year

Mechanical Components/Tools:

- 2 Masks will last for 3 years
- 2 Win

Implementation Schedule

Electrical Components/Tools:

The reflow oven will be used to assemble PCBs needed for our robot. Crimping tools will be used when we get access to the team bays in E7. We will be taking out the wiring for the robot and to test PCBs as soon as we are able.

Additional Information

0

Cost Breakdown



Item	Option 1	Option 2	Option 3	Option 4
Electrical Component/Tools: This includes a reflow oven, crimping tools, a digital oscilloscope, and a solder paste syringe	1678	1138	638	0
Mechanical Components/Tools: Two reusable respirators, two winnovo tablets, pneumatic rivet gun, 8ft braided carbon fiber stock	950	770	435	0
Software Components/Tools: This includes raspberry pi cameras, and a nvidia jetson module	679	260	210	0
0	0	0	0	0
0	0	0	0	0
Total	3307	2168	1283	0



Midnight Sun Hardware Component Funding

Midnight Sun Solar Car Team
0
Dhruv Hari - Sponsorship Lead
d2hari@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

The estimated life cycle for our hardware components will be two years for this vehicle.

Implementation Schedule

Integration of boards – October 2020
Integration into MS XIV - March 2021
Competition – July 2021

Additional Information

These are the component specifics.

Battery box components - The battery box components consist of acetal (plastic) holding the lithium ion cells in place along with the insulation around it to stop the spread of a potential fire.

Relays/ Contactors –

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
HW Contactors, cables, HV connectors, LV connectors, Misc. Testing and Validation, Busbar Connectors, Insulation Foam, Acetal	5000	4500	4000	3500

Student Team
Proposal S-99



HW Contactors, cables, HV connectors, LV connectors	3250	0	0	0
Cables, HV connectors, LV connectors	2500	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	10750	4500	4000	3500



Kraken of The Sky

Waterloo Rocketry

0

Shirley Kong, Team/Airframe Lead

s9kong@uwaterloo.ca

Description of Proposal

0

Proposal Benefits

0

Estimated Equipment Lifetime

All sponsored materials are expected to last for at least the lifespan of the launch vehicle (2-3 years). Most plumbing components can be reused and will last >5 years.

Implementation Schedule

All purchases will begin after designs are finalized and it is deemed safe to do so by the university, in response to the ongoing pandemic.

Additional Information

0

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Recovery	500	400	300	200
Propulsion	7000	5750	4500	4000
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
Total	7500	6150	4800	4200



Completing the Goose 5 project

Team Waterloo, SSDC

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Emrys Halbertsma, Project Manager
emrys.h@waterloop.ca

Description of Proposal

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Proposal Benefits

0

Estimated Equipment Lifetime

The battery system will be mounted to the pod for testing, and used until at least the next competition. The electrical team takes utmost care to maintain optimal battery health throughout testing, storage, and charging. Additionally, even after the batte

Implementation Schedule

May 2020

- Launch Spring term projects. Objectives are to work remotely on innovative research projects and help members develop key technical skills for upcoming projects.
- Continue developing an all-new team website and Team Hub (custom internal team m

Additional Information

Team Waterloo is grateful for the support that WEEF has shown over the years. The team will be happy to accept any partial funding. More information about our team, along with past and future initiatives, can be found on our website: <https://teamwaterloo>

Cost Breakdown

Item	Option 1	Option 2	Option 3	Option 4
Components, tools and necessary equipment to develop the pod's power system	1000	800	700	300
Prototyping and testing materials to allow for	1000	1000	600	400

Student Team
Proposal S-103



manufacturing and testing in-house motor designs				
Materials used for prototyping mechanical designs and manufacturing the pod	400	200	200	300
0	0	0	0	0
0	0	0	0	0
Total	2400	2000	1500	1000