

Company Information

Company Name	<i>Annihilare</i>	Date Submitted	<i>5/12/2021</i>
Project Title	<i>Process Chemistry Measurement System (ANNIHILARE_CHEM)</i>	Planned Starting Semester	<i>Fall 2021</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	2
Computer	1	Systems	
Other ()			

Company and Project Overview:

At Annihilare, we are ushering in a new generation of clean. We promote ***healthy environments for all people*** with our cutting-edge technology, and our EPA registered and Green Seal™ certified cleaners and disinfectants. We provide a comprehensive approach in ***fighting germs, while improving indoor air quality***. In these challenging times, being able to clean and disinfect safely and more often has never been more important. Annihilyte® is on the EPA approved List N for COVID-19.

Annihilare is pioneering a new approach in the development of cleaning products which do not rely on harmful chemicals. The actual process that creates Annihilyte® and Catholyte FREE solutions is called electrolysis or a form of electrochemistry. Basically, we start with a simple brine solution and use electricity to create a powerful disinfectant and degreaser without using harmful chemicals. The disinfectant is 500ppm FAC hypochlorous (HOCl) at 6.5-7pH and the cleaner/degreaser is sodium hydroxide (NaOH) at 10-12 pH. Our solution is generated at a pH range of 6.5 – 7. Other products are either very high pH (basic) or very low pH (acidic). Because the product is very close to neutral pH, benign and water-based, the germ lets it in freely. After it's inside, the FAC (Free Available Chlorine) destroys the bacteria, virus or spore – preventing resistance.

Like everything natural, Annihilyte® and Catholyte FREE revert back into simple salt water and don't burden the environment that we all live in. The same cannot be said about traditional products. This project's objective is to create a piece of test equipment that Annihilare can use in its production process.

	<p>This project is partially supported by a grant from the NC Manufacturing Extension partnership, an organization the helps to support business and job growth for NC companies. To learn more about the NC MEP, click on this link: https://www.ncmep.org/.</p>
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Project Requirements:

Annihilare makes their cleaning products in two ways: 1) at their production facility and 2) on their customer premises. When doing the processing, it is important to measure different aspects of the fluid characteristics in the batch. The parameters to measure are pH, ORP (Oxygen Reduction Potential), and salinity. Meters for these parameters are available off the shelf. The objective of this project is to package them together into a customs system with a user interface that meets Annihilare's needs. The system will be customized using an Arduino and user interface screen for display of information, calibration, etc.

Expected Deliverables/Results:

- Custom build meter system which has the following functionality:
 - The unit will use a probe to measure pH and display an output
 - The unit will measure ORP and display in output
 - The unit will measure TDS/Salinity and display an output
 - The unit will be able to use any off the shelf BNC connector probe, respective to its designed application
 - The unit will have the ability to be calibrated
 - The unit can operate on a 12vdc or 24vdc input power
 - The unit can provide an output value for potential integration with remote monitoring
 - The prototype unit should be a small form factor and scalable for eventual volume production
 - The unit will have a remote capability to allow a remote user to get the measurement data.
 - Cost target of unit should be between \$150 and \$250 on a volume basis

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Industry Supporter. The work product will be displayed at the last Expo then immediately handed over to the supporter unless arrangements have been made to deliver at a



future date.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Arduino devices
- Development of user interface systems
- Mechanical packaging
- Travel to Annihilare's Lincolnton, NC site as required.