Senior Capstone Project Proposal

The project is designed for a team of students working toward completion of a project, within two semesters[1].

Title	Environmental Chamber Independent Chamber Monitor
Sponsor	Contact person: Andrew Reichle Company name: UTEC
	Contact info: Phone #: 260-358-3285 Email: andrew.reichle1@carrier.com
Description	UTEC Validation is looking for a sensor that can be installed on our Thermotron environmental chambers. This sensor will monitor the environment in the chamber independent of the chamber in order to create a redundancy of data for unscheduled events within the environmental chamber. In the event of power loss or "glitches" with the environmental chamber, it is necessary to be able to ensure products under test were not exposed to an environment that is outside of the product specification, as it can compromise the results of testing. Requirements (Mandatory): The chamber monitor shall… • Accurately measure and record temperature from -55 to 90°C. Accurate to .1°C. • Monitor and record that power is running to the products in a chamber. (This can be monitored by measuring the presence of a voltage across a contactor that allows power to products in the chamber.) • Monitor and record that the chamber has power. (Can be measured via contactor.) • Saves recorded data to physical media (examples: USB drive or SD card) and can hold up to 21 days of data (likely ~300 Mbytes). • Temperature sensor that is replaceable and able to be calibrated. • Continue to function in presence of condensation or high humidity. • Continue to function without external power for up to 8 hours in the event of building power loss. • Display the current temperature the sensor is detecting.

[1]In general, one semester has 15 weeks. For a 3 credit hours course, a student is expected to work minimum of 8 hours per week for the project which is equivalent to minimum of 120 hours.

Disciplines (ME, EE, CS, etc.)	Freeman, Andrew S. (EE &CPE); Watters, Breeanna M. (EE); Miller, Tyler J. (CPE)
Estimated budget	$3000
Technology Disclosed? If so, what?	N/A
Additional requirements	Additional Requests (Desired, not mandatory): The chamber monitor could… • Accurately measure and record humidity. • Detect and record condensation. • Contain redundant sensors for improved reliability. • Record data redundantly for improved reliability • Save data to storage over Wifi/network • Assess temperature/humidity profiles and send email alerts to deviations from the profile. • Display the current humidity, if battery backup needs replaced, and indicate if a temperature profile has been deviated from.
NDA or IP Assignment agreement requested?	N/A
Faculty Advisor	Dr. Hossein Oloomi

Technology and ECCN:

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"If your project involves 'technology' that is either (a) not publicly available or (b) includes proprietary source code (not executable files), then it requires an ECCN." 'Technology,' for this purpose, is defined as "information necessary for the development, production, use, operation, installation, maintenance, repair, overhaul or refurbishing of an item. Technology may be in any tangible form, such as written or oral communications, blueprints, drawings, photographs, plans, diagrams, models, formulae, tables, engineering designs and specifications, computer-aided design files, manuals or documentation, electronic media or information revealed through visual inspection."

Interactive tool to determine ECCN:
https://www.bis.doc.gov/index.php/export-control-classification-interactive-tool

NDAs and IP Assignments:
The sponsoring company typically has NDAs and IP assignment forms that it wishes to use. Neither the NDA nor the IP assignment is an agreement with Purdue directly; these agreements are between the students and the sponsoring company. Of course, our office can review the company-provided documents to be certain it aligns with Purdue's standards. Alternatively, our office has draft agreements which we could provide for the sponsor's use. Again, as NDAs are between the student and the sponsor, Purdue cannot be a party to or advise the sponsor or the student on the NDAs, other than to outline some basic expectations as to fairness and suitability of the NDA to a student project.

Sponsor Acknowledgements:
By way of background, Purdue University professors who have senior capstone class projects involving outside sponsor companies notify our office so that we can prepare an acknowledgement form for the sponsoring company's completion. This is not a contract but an acknowledgement form signed by sponsoring companies which lays out Purdue's guidelines regarding class projects and outside company inputs, potential export control issues, and student intellectual property. Some sponsoring companies offer a monetary donation to the project, but that is not a requirement.

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