Senior Capstone Project Proposal

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

Title	Battery Powered Wet Floor Sensor
Sponsor	Contact person: Kevin Fox Company name: Franklin Electric
	Contact info: kevin.fox@fele.com; 260-704-1479
Description	Wherever there is water usage in a living space, there is a potential for water damage. The goal of this project is to create a small device that can monitor for wet floor conditions and send a Bluetooth notification to shut off water to the building. A base unit (not developed by students) will receive the notification and either stop a motor and pump in a well or shut off a main valve to the building. The students are required to send a notification that a wet floor has been sensed or an error code noting that the sensor is not behaving as expected. All of this would help to limit the scope of water damage and provide value to the customer. Schematic design and PCB layout will be in Altium. Embedded firmware programming will be in C or C++. Communication protocol between Wet Floor Sensor and base device will be Bluetooth. Plastic enclosure can be designed by students or Franklin Electric Engineers if necessary. High-end 3D printer at Franklin Electric can be used to create prototypes.
Disciplines (ME, EE, CS, etc.)	EE, CE, CS
For ECE	Please provide details about the expected project contents. For hardware, please list the possible techniques, such as PCB design, analog circuit, signal conditioning, RF circuit, PLC, embedded system firmware, and robotic control. For software, please list possible programming languages, such as Python, C, C++, C#, Java, and Javascript.[2]
Estimated budget	$10,000

[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.

[2]This information is for reference purposes only, and it will help us to identify a suitable faculty advisor and form student teams..

Technology Disclosed? If so, what?	Embedded firmware, schematics, board layouts, Internet Protocols, IoT, Azure, database, web application, Mobile application.
Additional requirements	Battery must last at least 3 years with one wet floor event per month. Design decisions must be made to consume low power and accommodate this requirement. Qty. 2 AA batteries can be used as a competitive benchmark. Enclosure dimensions smaller than 2in x 3in x 3in
NDA or IP Assignment agreement requested?	Yes, same as previous semesters.

Technology and ECCN:
"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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