INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Monroe Science Center/Bosch Community Fund*	**Date Submitted**	*10/24/2024*
Project Title	*Design of a Bicycle Driven Energy Generator (MSC_BIKE)*	**Planned Starting Semester**	*Spring 2025*

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	3	Electrical	2
Computer	1	Industrial/Systems	

Company and Project Overview:

Monroe Science Center opened in January of 2023. Located in Downtown Monroe and operated by the City of Monroe, we are an educational science center focusing on STEAM. Our exhibits cover a wide range of topics such as aerodynamics, engineering, agriculture and technology. We exhibit projects that are safe and interactive for our guests age one through adulthood. By the end of 2024 we hope to serve 20,000 visitors.

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More information can be found at www.monroesciencecenter.com

The objective of this Monroe Science Center project will be to develop a custom exhibit that displays the output of energy powered by riding a bicycle. This bicycle should create enough energy to power three types of lightbulbs: incandescent, fluorescent and LED. The bicycle should reflect the amount of energy needed for each lightbulb. For example, the rider should have to pedal harder and longer to power the Incandescent and pedal lighter to power the LED. This demonstration will illustrate that more effort generates more energy and that different energy using appliances can have dramatically different energy efficiencies.

Project Requirements:

The exhibit must be functional and safe to operate for all visitors and be ADA accessible. The exhibit must fit within a 6'x6' space.

Monroe Science Center staff will work with the UNCC students to give design feedback to the student teams ideas for a successful exhibit.

Project requirements:

- Unit must be able to withstand five years of hard usage from guests of the science center.
- Unit to be safe to operate with children and not pose any physical dangers. For example, no pinch points/sharp edges.
- Bicycle should be adjustable to facilitate different size users
- Unit to have a display indicating rpm, watts generated
- Unit interface to floor to be developed based on science center direction.
- All cords should be hidden inside of unit

- The difficulty of riding the bicycle should reflect the energy needed for each type of lightbulb.
- Text for instructions for using the exhibit and for science interpreting/explaining the exhibit should also be provided by students.
- Working prototypes to be tested by visitors and staff of the science center.
- The exhibit should include signage or labelling crediting the financial sponsorship by the Bosch Community Fund , and the UNC Charlotte logo recognizing the student work.

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

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

- Travel to Monroe Science Center will be required at the beginning of the first semester to understand the centers approach to exhibits. Travel will also be required to deliver and install the exhibit and possibly for test and verification. Travel will be reimbursed according to course policy.

- Interest in completing all aspects of a STEM exhibit to deliver a functional exhibit that can be immediately installed and withstand usage for up to five years.