INDUSTRIAL SOLUTIONS LABORATORY

UNC Charlotte – Lee College of Engineering Senior Design Program

Company Information

Company Name	*Cellular Farms Inc*	**Date Submitted**	*10/21/2022*
Project Title	*Design and Prototyping of a Vertical Farm Platform* ***(CELLULAR_FARM)***	**Planned Starting Semester**	*Spring 2023*

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	1
Computer	1	Systems	

Company and Project Overview:

Cellular Farms Inc. is a whole plant supplement company that produces its products from plants we grow ourselves indoors. Our supplements are derived from whole plants, grown to maximize the key compounds we're targeting. This ensures a higher absorption rate and thus health impact. See more at https://www.cellularfarms.com/.

This project will design the physical infrastructure used to grow the plants indoors. The design will optimize space, so that the plant production is maximized for the available area. The scope of this project is to design two components: a food grade pallet that doubles as a hydroponic tray, as well as a food grade pallet decking that holds the growing pallet in place during the growing cycle. The pallet decking will also hold the mechanical equipment for the pallet below (lights, camera, plumbing, etc.). The goal is to prototype the components that could be used to upfit an entire warehouse, focused on quality and cost efficiency.

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Project Requirements:

The project will generate and prototype designs for the grow pallet, control system and the decking. The decking will provide physical support for the grow pallets and also the lighting, watering and sensors present in the system. Control system will allow remote computer control of lighting levels, amount of mist and camera views. Successful prototype demonstration for this project will define the production scheme for the factory.

The pallet will need to be approximately 4'x4'x.25'. The decking needs to be similar in size, be able to hold the pallet above it (weighing at 100 lbs. max) and hold the following:

- LED lights
- Fans
- Mist tubing and nozzles
- Cameras

All these need to be easily plugged in on the back of the racking. Remote control adjustment through a computer screen will be demonstrated to adjust water and lighting levels.

Both components will be attached to pallet racking that is economical and functional.

The pallets must be able to be lifted by standard pallet trucks (See examples like this or this).

Expected Deliverables/Results:

- Manufacturing quality CAD drawings.
- Bill of Materials for all components.
- Assembly instructions for routing cables, plumbing, wires.
- Prototype that functions in the lab.
- Remote control of mist and lighting levels.

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):

- While this is an engineering project it is focused ultimately on hydroponic agriculture. If from previous course work or the students had a general understanding of plant science, this would be helpful to maximize the effectiveness of the project.