INDUSTRIAL SOLUTIONS LABORATORY

UNC Charlotte – Lee College of Engineering Senior Design Program

Process for Supporting a Senior Design Project

Thank you for your interest in participating in the UNC Charlotte Lee College of Engineering Senior Design Program. The Program's goal is to provide students with industry design challenges as part of their Senior Design academic course. In this capacity, our students gain real world engineering experience while companies benefit from completed work on elective research projects. The ideal project should not be on a critical path for the company ("backburner" projects are good candidates), nor pertain to trade secrets or corporate sensitive information. Projects last for two semesters.

The senior design teams typically consist of 4-6 students, a faculty mentor, and a technical contact from the industry supporter. We estimate about 250 hours of work output per student over two semesters. The donation to cover the costs of participation is $9,500. $3,250 of this amount is given to the students to cover their material and travel costs for the project. The balance of the donation is to cover the overhead costs of running the Program. This cost covers both semesters. Project expenses of more than $3,250 will not be authorized unless the supporter agrees to additional funding. Unused material budget money does not roll over to future projects and is returned to the Program to offset overheads. Donations will be invoiced (Net 30) once the Project Description (pages 2-3 of this document) is finalized and the project is accepted and staffed for the upcoming semester – that will be in the Dec 2024 – Jan 2025. timeframe.

As a tax-deductible (consult with your tax professional to confirm) donation to a non-profit educational program, results cannot be guaranteed, and the project work should not be considered contract engineering.

Our goal is to have Spring 2025 Semester Projects defined by Nov 15, 2024. There are a limited number of slots, projects are accepted on a first come, first serve basis, and once sold out, a project will be put on a waiting list for the following semester.

The documentation (see following pages) required from the industry supporter:

1. Company information for the technical and the financial representatives.
2. A short description of the intended project with expected deliverables/results (Project Description Form). Students will use this information to select their project preferences and Faculty will use it to develop a staffing plan for the project. Examples of completed forms from past projects can be viewed at: Past Project Examples

Email forms to the Program Director, Jim Hartman (jim.hartman@charlotte.edu). If you have any questions or need help defining the scope, please email or call Jim at 704-614-9766.

Project work starts in Jan 2025 with the Senior Design Kickoff Event on Jan 17, 2025. This is the first meeting between the team and the industry supporter with the objective being the further definition of the Statement of Work and Specifications for the project. The first semester is the design phase, and the second semester is the implementation/build phase. The teams will meet weekly with their faculty mentor to discuss progress. Supporter technical representatives are invited, at their option, to attend by phone, virtual meeting, or in-person. Each semester, there are the Kickoff Breakfast, two design reviews and an end of semester exposition – attendance of these 4 events (on-campus) is mandatory to ensure awareness and agreement for project direction. The first semester Senior Design Expo is May 2, 2025 and the second semester Expo is Dec 4, 2025. We look forward to your participation in the Senior Design Program!

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Company Information

Company Name	*Gallo*	**Date Submitted**	*10/8/2024*
Project Title	*Optimization Design for Clean in Place Equipment*	**Planned Starting Semester**	*Spring 2025*

Faculty Mentor

Faculty Mentor will be assigned to the project. If you have been previously working with a faculty mentor and want to continue that relationship, then enter their name here _____. We cannot guarantee that faculty mentor will be available, but we will try to make that assignment if possible.

Technical Contact(s)*

Technical Contact	Name	Email	Phone
1	Morgan Alana	Morgan.Alana@ejgallo.com	209-398-4804
2	Andy Fusia	WAnders.Fusia@ejgallo.com	209-345-0951
3			

*We would like to have more than one technical contact, so there is a back-up in case of travel, sickness, job re-assignment, etc. Also, these are the people that will have Event (Kick-off/Expo) invitations and name badges made for them, so please identify them to us so we can properly include them.

Financial Contact**

Name	Email	Phone
Andy Fusia	WAnders.Fusia@ejgallo.com	209-345-0951

Billing Address	2386 Catawba River Rd, Fort Lawn, SC 29714

** This is the person that understands that they will receive and process the invoice.

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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		Electrical	
Computer		Industrial/Systems	5

Company and Project Overview:

Gallo is the leading manufacturer of alcohol-based products and recently opened a manufacturing facility in Fort Lawn, SC in early 2023. At this facility, there are three production lines manufacturing seltzer cans, vodka in a 50mL format, and vodka in a 750mL & 1/1.75L bottle. To support these lines, there are also two blending skids and a series of tanks that are used to hold and bottle out liquid. All the above equipment is cleaned between runs with 4 CIP (clean in place) skids. Extended cleaning times lead to increased utility costs (steam/water) and a decrease of available time to utilize the asset.

Project Requirements:

The CIP system is not well recorded and therefore not currently optimized across the plant. Students would work as a team to define current state CIP times and bottlenecks then propose recommendations for how to shorten the length of time for CIPs & decrease utility costs.

Project objectives (expected):

1. Perform time studies to record how long each CIP takes for each plant circuit
    1. There is a total of 29 circuits - 15 would be prioritized over the others
2. Propose improvements based on circuit with the goal of reducing overall time
    1. Examples include but not limited to— flow rate increases, shortening flush steps based on piping length, optimizing circuit to have less volume of water in tanks during cleaning
3. Work cross functionally with teams onsite to validate proposed changes
4. Propose design changes to system with goal of reducing overall time
    1. Examples include but not limited to— pump design, tank device design, chemical delivery system

Expected Deliverables/Results:

- Completed matrix that shows CIP times per step for each plant circuit
- Compiled recommendation of how to reduce CIP timers per step for each plant circuit
- Compiled results after validation with utility cost savings estimates
- Propose design changes to system with goal of reducing overall time

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):

- Interest in Manufacturing Systems optimization
- Ability to travel to Gallo's Ft. Lawn SC site multiple times during each semester.