INDUSTRIAL SOLUTIONS LABORATORY

Department Project Information

Department Name	*MEES - Motorsports*	**Date Submitted**	*04/19/2023*
Project Title	*FSAE_EV_Powertrain* ***(FSAE_ELEC4)***	**Planned Starting Semester**	*Fall 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	2-3	Electrical	2-3
Computer	0-1	Systems	
Other ( )			

Project Overview:

The SAE International Formula SAE program is an engineering design competition for undergraduate and graduate students. The competition provides participants with the opportunity to enhance their engineering design and project management skills by applying learned classroom theories in a challenging competition. The engineering design goal for teams is to develop and construct a single-seat racecar for the non-professional weekend autocross racer with the best overall package of design, construction, performance and cost.

The concept behind Formula SAE is that a fictional manufacturing company has contracted a design team to develop a small Formula-style racecar. The prototype racecar is to be evaluated for its potential as a production item. The target marketing group for the racecar is the non-professional weekend autocross racer. Each student team designs, builds and tests a prototype based on a series of rules whose purpose is both to ensure onsite event operations and promote clever problem solving. The vehicle will be inspected in a series of tests to ensure it complies with the competition rules; in addition, the vehicle with driver will be judged in many performance tests on track. The rest of the judging is completed by experts from motorsports, automotive, aerospace and supplier industries on student design, cost and sales presentations.

Project Requirements:

Design, build, and test the electric powertrain for the car being prepared for 2024 FSAE EV competition, including battery pack, management system, and motor. This powertrain must comply with all rules and regulations for the 2024 FSAE EV design competition. It must also integrate with the overall vehicle design

developed by the UNCC FSAE EV club. Coordination and cooperation with the club on this project is required. All documentation required by the Formula SAE EV competition related to powertrain must also be prepared and submitted by this team, in coordination with the FSAE EV team captain.

Expected Deliverables/Results:

Deliverables include:
- All senior design course deliverables
- All powertrain related competition deliverables as specified by SAE
- Complete 3D CAD Design and component sources
- BOM for sources
- Documentation and calculations
- Operational and Competition ready FSAE Car EV powertrain, completed in time to prepare for competition
- Test and acquire data from the completed powertrain
- Depending on the availability and state of completion of the car, test the powertrain in the car

Disposition of Deliverables at the End of the Project:

Hardware developed and documentation for competition is the property of the mentor and department.

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

- Motorsports concentration – Not required, but motorsports concentration has priority
- Student Member of SAE and the FSAE student organization– Not required, but has priority