INDUSTRIAL SOLUTIONS LABORATORY

Department Project Information

Department Name	*MEES - Motorsports*	**Date Submitted**	*07/11/2024*
Project Title	*FSAE Internal Combustion (UNCC_ME_FSAE_ICV3)*	**Planned Starting Semester**	*Fall 2024*

Funding

What is the source of funds that will be used to cover all direct costs of this project? Combination of department funding, student organization crowdfunding, Kulwicki foundation, and other sponsorship

Is this source of funds already secured? Yes_X___ No____

Work Space

Have you secured a lab/work space for the project to be built? Yes__X__ No____

Faculty Mentor/Grading Instructors *

	Name	Email	Phone
1	Tyler Stover	tstover1@charlotte.edu	704-687-8114
2			
3			

*List any graduate student that will be working on the project as a grading instructor so that they may be added to Canvas.

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	4-6	Electrical	
Computer		Systems	
Other ( )			

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Project Overview:

Per the SAE International Formula SAE rulebook, "The Formula SAE® competitions challenge teams of university undergraduate and graduate students to conceive, design, fabricate, develop and compete with small, formula style vehicles. Formula SAE® is an engineering education competition that requires performance demonstration of vehicles in a series of events, both off track and on track against the clock. Each competition gives teams the chance to demonstrate their creativity and engineering skills in comparison to teams from other universities around the world."

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. UNC Charlotte has separate teams competing in the Formula SAE Internal Combustion and Electric Vehicle competitions. This senior design project is in support of the internal combustion team.

Project Requirements:

The FSAE Internal Combustion Senior Design project team will work alongside the club team to complete the 2025 competition vehicle. All team members are expected to contribute to the design, fabrication, building and testing of an internal combustion FSAE competition vehicle in accordance with the FSAE 2025 Rules. The team is also required to prepare and present sales, design evaluation, cost, and technical inspection documents in accordance with competition rules.

The Senior Design team members will be required to clearly identify the specific work contributions and areas of responsibility distinct from the club effort. Coordination with club members is required to ensure projects fit within the team competition goals. Senior Design team members are expected to produce work commensurate with their senior standing and experience. Team members will be required to take laboratory safety tests to access the team workspaces. All team members are expected to attend pre-competition testing events and to participate in team outreach and fundraising. The Formula SAE competition is very demanding, and a successful effort requires at least an average of 15 hours per week from each team member, and work is to include fall, winter, and spring break times.

Expected Deliverables/Results:

Deliverables include:
- All senior design course deliverables
- All 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
- Data acquired from pre-competition tests
- For full credit the team MUST compete in the 2025 Michigan event at the sole discretion of the Mentor.

- Failure to compete in the 2025 Michigan event may result in an unsatisfactory grade at the sole discretion of the mentor.

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
- Proficiency in at least one of the following software environments:
    - CAD: Solidworks
    - FEA: Ansys
    - CFD: Star CCM
    - Scripting: MATLAB, Python
    - Dynamic system simulation: Dymola
    - Data acquisition and Engine Control: Motec