



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

UNC Charlotte – Lee College of Engineering Senior Design Program Company Information

Company Name	Mechanical Engineering - Motorsports	Date Submitted	11/7/2019
Project Title	FSAE Carbon Fiber Chassis Design (FSAE_CHASSIS)	Planned Starting Semester	Spring 2020

Funding:

What is the source of funds that will be used to cover all of the direct costs of this project?
ME Department? _____

Is this source of funds already secured? Yes No

Technical Contact(s)*

	Technical Contact 1	Technical Contact 2	Technical Contact 3
Name	Dr. Charles H. Jenckes		
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*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.

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	Electrical	
Computer		Systems	
Other ()			

Project Overview and Requirements:

The SAE International Formula SAE program is an engineering design competition for



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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.

Autocross or Time Attack is a Motorsport competition that features competitors driving their vehicles on a road course, or on a temporary circuit laid out on a runway/ large parking. Simply, competitor and vehicle race against the clock without wheel to wheel competition. This senior design project will be to design, analyze, build and test a carbon-fiber chassis for a 2.3 m wheelbase competition vehicle. Students will first create chassis concepts with the guidance of industry professionals and evaluate them using FEA methods on state of the art software. The goal will be to produce a chassis with the highest achievable stiffness to weight ratio. Students will then participate in the composite tool design and chassis layup. Finally the complete chassis will be tested for correlation to the FE model.

Expected Deliverables/Results:

Deliverables include:

- Design of a Carbon Fiber Chassis for FSAE.
- 3D CAD Model and 2D drawings of Carbon Fiber Chassis
- All supporting Documentation and Calculations
- FE model of chassis
- Design of a Carbon Fiber Chassis for FSAE.
- Composite tool design and chassis layup

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

- Solid Mechanics