

ORU

# Formula SAE



## *About Formula SAE*

Organized by SAE International (formerly Society of Automotive Engineers), Formula SAE® (FSAE) is a student design competition. The basis of the competition is to have students devise and construct a small Formula-style racecar, as if a manufacturing company has contracted them as a design team. As part of this competition, the car is evaluated as for its potential as a production item. The target marketing group is the non-professional weekend autocross racer. Working under a series of rules, each team uses innovation and problem-solving skills to create a prototype that guarantees safety during events.

Formula SAE is a venue that allows students to use the knowledge that they have gained from the classroom and actually put it into practice. Giving the students a taste of a real work experience, FSAE promotes careers and excellence in engineering as it encompasses all aspects of the automotive industry, including research, design, manufacturing, testing, developing, marketing, management and finances.

Currently, there are a total of seven official Formula SAE events, both nationally and internationally. In the US there are three events: Formula SAE California, Formula SAE Virginia, and Formula SAE Michigan. The Michigan one is the largest event and is considered the world championship.

For more information see <<http://students.sae.org/competitions/formulaseries/fsae/>>.



## **Competition Scoring**

In accordance with the emphasis on the manufacturability of the vehicle, the competition is not based solely on how well the racecar places in the race. Instead, the following criteria are used to determine the placement of the vehicle in the competition. There is a total of 1000 points possible for competition scoring.

### **Scoring Breakdown**

#### **Static Events**

##### **Presentation (7.5%)**

Students deliver a quality technical sales presentation that persuades the fictional manufacturer to put the car into production. The judges are to be assumed to be executives of a corporation.

##### **Engineering Design (15%)**

This event rates the quality of engineering design used in the development of the racecar. Judges evaluate the team's innovative ideas as well as test the reasoning and theory behind the design by questioning the students. During this event, the vehicle's test data and analysis are also scrutinized.

##### **Cost Analysis (10%)**

Teams must submit a report detailing the total prototype cost of the vehicle and capital expenditures (plants, machinery, and tools) for a limited production run by a hypothetical manufacturing firm. There is no maximum cost.

#### **Dynamic Events**

##### **Acceleration (7.5%)**

In four 75-meter runs, the fastest time is recorded to test the acceleration.

##### **Skid-Pad (5%)**

The cornering capability of the racecar is evaluated by driving the car in a figure-eight formation as fast as possible without knocking over any of the cones that outline the course.

##### **Autocross (15%)**

Drivers must maneuver the car through the tight turns and slaloms of a one-lap course. Any cones knocked over count as penalties. Each team is granted four attempts, of which the fastest lap time is recorded.

##### **Fuel Economy (10%)**

During the Endurance event, the fuel economy is calculated and compared with the other vehicles.

##### **Endurance (30%)**

This intense 22-kilometer closed-course race tests the limits of the car and requires a driver change in the middle. Cars are not allowed to leak any fluids, and only cars that cross the finish line can score any points.

For more information, read the rules on the FSAE website:

<http://students.sae.org/competitions/formulaseries/rules/2009fsaerules.pdf>.

## *ORU Formula SAE Racing*

### **ORU's FSAE Team**

The ORU Engineering and Physics Department is currently looking to put itself on the map with a formula SAE racecar that would be built and raced by students in national SAE competitions. Drawing from students all over campus, the ORU team looks to include anyone who has an interest in this project. The team already consists of engineering and business students. Some are in it to make a senior project out of an aspect of it, while others are in it for the experience. Regardless of what their major is, motivated students compose this team and are eager to accomplish the project.

At present, the team has three chief members who are in charge of various aspects of the project. More managers as well as members are expected to emerge as the project evolves and gains momentum.



**Jonathan Luth**

Team Leader

A senior mechanical engineering student, Jonathan has decided to make this venture part of his senior project. He is combining his three years of college courses with his previous experience with building cars in Electrathon.



**Ryan Kral**

Business Manager

As part of his senior project for his marketing major, Ryan has taken on the management of the marketing, finance, and business aspects of the project. He also has experience with Electrathon.



**Brian Ostling**

Project Manager

Combining his business and mechanical engineering background, Brian comes to this mission with the purpose of also using it for his senior project. In addition to his three years of classes, he has also won the SHPE NTCC Engineering Challenge.

Currently, the team is in the beginning stages of the project, preparing to be in full swing when the new school year begins in August. As funding is being obtained, the members have been brainstorming and designing the vehicle. With the modeling of the vehicle already in progress, the plan is to be able to start building it upon arrival back at ORU for the 2009-2010 school year.

Even though the team is excited and organized, they will not be able to do it by themselves. The ORU community and others are needed. Encouragement, involvement, participation, and support are all necessary components that others will need to provide.

**Budget**

From initial research and preliminary design work, the estimated budget is listed in the table below. As it is a projection, values are subject to change as more information becomes available.

## Projected Budget

<b>Car Completion</b>	
Brake System	\$2,000.00
Engine	\$4,000.00
Drivetrain	\$4,000.00
Cooling	\$600.00
Frame	\$1,500.00
Body/Composites	\$2,500.00
Instruments and Wiring	\$2,500.00
Safety and Misc.	\$2,000.00
Steering System	\$300.00
Suspension and Shocks	\$2,500.00
Wheels and Tires	\$2,000.00
<b>Total</b>	<b>\$23,900.00</b>
<b>Development</b>	
Dyno	\$9,000.00
Data Acquisition	\$5,600.00
<b>Total</b>	<b>\$14,600.00</b>
<b>Operations</b>	
Office Expenses	\$4,900.00
Manufacturing Total	\$6,000.00
Miscellaneous Total	\$1,700.00
<b>Total</b>	<b>\$12,700.00</b>
<b>Travel</b>	
Michigan Competition	\$7,500.00
Virginia Competition	\$4,000.00
California Competition	\$7,150.00
Goodyear Shootout	\$1,600.00
Autocross	\$800.00
Windtunnel and Goodyear Test	\$2,000.00
Shake Rig after Virginia	\$1,200.00
<b>Total</b>	<b>\$24,250.00</b>
<b>Total Budget</b>	<b>\$75,450.00</b>

# *ORU Formula SAE Racing*

## ***Students' Benefits***

Obviously, this project will give each student an introduction to the business world. They will have to research, ask questions, work hard, find finances, and deal with people. Leadership, submission, and teamwork are intricate parts of this project that no one on the team will be able to elude. By combining the different knowledge and skills of each member, the team will gain the priceless experience of working with a team of people from different backgrounds to accomplish a single goal.

## ***Benefits for ORU***

If any high-school student were to visit ORU's Engineering and Physics Department and see this ambitious project coming to life, it is almost a guarantee that the student would think that the engineering department is indeed a department that can compete on the same academic levels as other engineering schools. Additionally, although the sports teams may draw attention to ORU, it is time for ORU to be known for its academics. By competing at the SAE competitions, ORU will become known internationally in a whole new arena. This project does not end at the end of the next school year but is something that can be carried on through the future generations of ORU students. Hopefully, this competition will be carried on through the upcoming years by students who are interested in this program. It also can continue to provide a channel for future senior projects.

## ***Sponsor Benefits***

By choosing to sponsor this project, not only will the sponsor be enabling students with a hands-on learning experience, gracing ORU with this opportunity to put itself on the map in a novel way, and giving back to the community, there are several other advantages and benefits to which the sponsor will be entitled. The most prominent ones are enumerated here.

- All donations are 100% tax deductible.
- Company's name and logo gets national and international exposure as contributors of the team as the car competes in the FSAE events.
- Opportunities are available for networking.
- As university students from all over the world will be at the competitions, there are multiple chances to advertise the company to future engineers and possible future employees, which include the ORU team members.

In addition to these benefits which are available to all sponsors, there are specific benefits which correspond to the various levels of sponsorship, which are listed on the next page.

**Sponsorship Levels**

\*\*If an individual instead of a company donates, the individual's name can be substituted for "company name/logo" in the sponsorship levels.

# **Title Sponsor (\$10,000+)**

- Large company name/logo in prominent position on car
- Large company name/logo in prominent position on team apparel
- Team Thank-You plaque
- Company write-up on website
- Large company name/logo displayed on its own sponsor board at races and in shop
- Company name/logo on website with link
- Company name/logo in our "ORU Race Team Newsletter"
- Possibility of car availability for event appearances
- Other opportunities available upon request

# **Miracle Level (\$7,500+)**

- Large company name/logo on car
- Company name/logo on team apparel
- Team Thank-You plaque
- Company write-up on website
- Large company name/logo at races and in shop
- Company name/logo will appear on website with links
- Company name/logo will appear in our "ORU Race Team Newsletter"

# **VISION LEVEL (\$5,000+)**

- Medium company name/logo on car
- Company name/logo on team apparel
- Team Thank-You certificate
- Company write-up on website
- Company name/logo at races and in shop
- Company name/logo will appear on website with links
- Company name/logo will appear in our "ORU Race Team Newsletter"

## ***Inspiration Level (\$3,000+)***

- Company name/logo on car
- Company name/logo on team apparel
- Company name/logo at races and in shop
- Company name/logo will appear on website with links
- Company name/logo will appear in our “ORU Race Team Newsletter”

## ***HOPE LEVEL (\$1,000+)***

- Small company name on car
- Small company name/logo on team apparel
- Company name/logo at races and in shop
- Company name/logo will appear on website with links
- Company name/logo will appear in our “ORU Race Team Newsletter”

## ***Dream Level (\$500+)***

- Small company name on car
- Small company name/logo on team apparel
- Company name/logo at races and in shop
- Company name/logo will appear on website
- Subscription of “ORU Race Team Newsletter”

## ***ORU Racing Partner (\$100+)***

- Company name/logo at races and in shop
- Company name/logo will appear on website
- Subscription of “ORU Race Team Newsletter”

## ***ORU Racing Friends (up to \$100)***

- Company name/logo will appear on website
- Subscription of “ORU Race Team Newsletter”

**Contact Us**

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