

## FORMULA HARDROCKER RACING TEAM MANAGER SENIOR DESIGN PROJECT

**Project Sponsor / Client:** Formula Hardrocker Racing

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**Project Term:** Fall 2012 – Spring 2013

**SDSM&T Project Program:** Industrial Engineering & Engineering Management

**SDSM&T Project Instructor:** Dr. Dean H. Jensen  
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### Project Overview:

Every year, a group of interdisciplinary students at SDSM&T work to develop the highest performance race car in the Formula SAE design series. Working with industry leading companies such as; Ford, Poet, Banner, RPM, and Nucor the Formula Hardrocker Racing team designs, manufactures, assembles, and tests their highly competitive race car. The team of students then travels to Michigan and Nebraska to prove the level of performance to which their car was designed. The team will also defend the design both conceptually as well as feasibly through presentations and business proposals. Throughout the year the team also visits sponsors such as Ford in an effort to validate systems on the car such as the aerodynamic package in the Jacobs wind tunnel. Outreach programs such as high school visits are used to attract bright young students to the South Dakota School of Mines and Technology.

This year the design process of the entire race car is being revisited to optimize the reliability and set-up of the race car. The main objectives of this project are detailed below:

- Design, build, test, and compete with a lightweight high performance race car featuring highly reliable and integrated systems.
- Increase the reliability of the car through rigorous test regiments.
- Accelerate the design phase to allow for punctual manufacturing and lengthened testing
- Integrate necessary sensors and utilize data to enhance the vehicles performance

Student project team members will survey the current design and manufacturing processes, and report to the supervisors as necessary to verify timely progress of their designed system(s).

### **Project Background:**

Formula Hardrock Racing is developing a high performance race car which competes on an international stage consisting of some of the best young engineers in the world. This is an interdisciplinary project requiring the technological knowledge from the following engineering backgrounds: Mechanical, Electrical, Metallurgy, and Industrial. This portion of the proposal details the Industrial Engineering requirements and deliverables as seen by the client and for a successful project.

### **Project Team Requirements and Deliverables Description:**

This project will require a team of interdisciplinary, senior design students; as well as a fantastic supporting cast of undergraduate students. This project may require only one IE student, but the client is willing to work with the senior design coordinator to ensure adequate projects for a maximum of two IE students. The students will be required to work with the other senior design students, attend weekly meetings and provide reports to the client as requested. The following deliverable items are expected for this project:

#### ***IE Student 1***

Primary Objective: To assist Formula Hardrock Racing in developing a Gantt chart, as well as to implement secondary measures to keep the project on schedule. The student will need to work entirely hand in hand with the system leads on this portion of the project.

Secondary Objective: To assist in scheduling and organization of all outward facing public relations. This may consist of working with existing sponsors, attracting sponsors of interest, or working with supply chains.

#### ***IE Student 2***

Primary Objective: To facilitate the utilization and optimization of the 5 design reviews; SRR, PDR, CDR, TRR, and PRR. These design reviews will need to be included in the development of the Gantt chart developed by IE student 1.

Secondary Objective: Contribute to a business case plan in accordance with Formula SAE competition guidelines. The student will work with members of the team and provide recommendations based on expertise and knowledge.

These items are expected within the time frames and along with the other deliverables described in the Industrial Engineering and Engineering Management Senior Design Projects document. That document provides a more complete description of the process, deliverables, and timing of SDSM&T IEEM Senior Design Projects.