



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

## Senior Design Project Description

<b>Company Name</b>	UNCC COE	<b>Date Submitted</b>	7/24/18
<b>Project Title</b>	BAJA SD	<b>Planned Starting Semester</b>	Fall 2018

### Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical or MET	4	Electrical or EET	0
Computer	0	Systems	0
Other ( )			

### Project Overview:

As described by the SAE: In Baja SAE, engineering students are tasked with designing and building a single-seat, all-terrain sporting vehicle that is to be a prototype for a reliable, maintainable, ergonomic, and economic production vehicle that serves a recreational user market. The students must function as a team to design, engineer, build, test, promote, and compete with a vehicle within the limits of the rules.

### Initial Project Requirements:

This project requires the design and construction of a rules compliant vehicle as described by the SAE. More or less focus may be put on individual subsystems depending on the required areas of improvement. Vehicle dynamics and structural strengths will be tested and analyzed. Strong use of analysis and CAD software will be used to create and test parts and systems for the vehicle. Emphasis will also be placed on physically building and producing the vehicle and subsystems. This will include but will not be limited to use of manual mills and lathes, CNC machines, and welders. The goal will be to produce a vehicle 10% lighter than the 2017 vehicle and an engineering package to be presented and tested at the yearly SAE baja competition.

### Expected Deliverables/Results:

1. All course deliverables



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2. All competition deliverables as specified by SAE
3. Applicable FEA on designs.
4. Applicable Engineering development notes per each designed part
5. Initial calculations and design decisions recorded
6. System detailed drawings
7. System assembly drawings and procedure
8. Detailed cost report for all designed parts and systems
9. System / subsystem testing plan
10. Financial/sales plan
11. Outreach plan
12. Vehicle test procedure and checklist
13. Finished, working vehicle
14. Transition Plan for knowledge retention for future groups and competitions.

### **Disposition of Deliverables at the End of the Project:**

Hardware, software and equipment will be maintained by the team and the mentor for the duration of the project. At the completion of the project, all equipment, hardware and documentation will be turned over to the mentor and maintained by the Kulwicki Motorsports lab for following teams planning and use. Team tool box will be inventoried and organized, toolbox key turned in.

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

Student should have an interest in one or more of the following:

Part design, Vehicle Dynamics, CAD software, CAM Software, CNC and Manual Machining, Fabrication skills, Welding, Structure Analysis, Racing Vehicles, Engines and Test Equipment, Engineering testing.

Knowledge of the following desired

CAD - Solidworks

Matlab , Mathcad

Optimum K/G

ANSYS or other

Microsoft Project

Microsoft Word

Mechanical understanding

Fabrication Skills (steel\aluminum)

General knowledge of the Kulwicki Lab and available tools and equipment