Course Outcomes  [Related ME Program Outcomes in brackets]

1. Apply the design process to the design of a vehicle (Mini-Baja or Formula SAE). [B1, B2, B3, C1, C3, C4]
2. Apply engineering fundamentals to evaluate the design of a vehicle. [A1, A2, A5]
3. Apply team-work skills to management of the Mini-Baja or Formula SAE teams. [A5, A6, B1, B2]
4. Learn the effect of design choices by building and testing students’ designs. [A3, A5, A6]

Design Process  (3 wks)

1. Problem Definition
2. Conceptual Design
3. Detail Design
4. Prototype Fabrication
5. Testing
6. Redesign

Team Management  (2 wks)

1. Budgeting/Sponsorship
2. Group Dynamics
3. Recruiting new team members
4. Training new team members
5. Mentoring future leaders
6. Motivating/leading teams
7. Logistics

Engineering Fundamentals Applications  (5 wks)

1. Stress analysis
   (Frame/suspension)
2. Kinematics/Kinetics
   (Suspension)
3. Machine Elements (Power train)
4. Electro-mechanical (Fuel-Spark Management)
5. Design for X (safety, maintenance, aesthetics)

Fabrication Techniques  (5 wks)

1. Machine Tools
   (Lathe, Mill)
2. CNC Machines
3. Welding
4. Heat-Treatment

Revision Date:  June 12, 2013
1. **COURSE NUMBER AND NAME:** ME 45500 Vehicle Design and Fabrication

2. **CREDITS AND CONTACT HOURS:** 3 credits  
   a. Lecture – 3 days per week at 50 minutes for 16 weeks

3. **COURSE COORDINATOR OR INSTRUCTOR:**  
   J. Starkey

4. **TEXTBOOK:** N/A

5. **SPECIFIC COURSE INFORMATION:**  
   a. **Course Description:** An open-ended project course in which the goal is to design and build competitive prototype vehicles. The integration of design concept formulation, engineering analysis and testing, and prototype fabrication within the broad context of the engineering enterprise. The broad range of product development activities is covered in the course in a hands-on setting. Design constraints imposed by manufacturing limitations, funding constraints and market competition are included in the process. Typically offered in both the fall and spring.
   
   b. **Prerequisites:**  
      Permission of Instructor
   
   c. **Status:**  
      Elective

6. **SPECIFIC GOALS FOR THE COURSE**  
   a. **Course Outcomes:**  
      [Related ME Program Outcomes in Brackets]  
      1. Apply the design process to the design of a vehicle (Mini-Baja or Formula SAE). [B1, B2, B3, C1, C3, C4]  
      2. Apply engineering fundamentals to evaluate the design of a vehicle. [A1, A2, A4, A5]  
      3. Apply teamwork skills to management of the Mini-Baja or Formula SAE teams. [A5, A6, B1, B2]  
      4. Learn the effect of design choices by building and testing students’ designs. [A3, A5, A6]

   b. **Related ME Program Outcomes**  
      [Related ABET Outcomes Listed in Brackets]  
      C1. Leadership; C2. Global Engineering Skills; C3. Innovation; C4. Entrepreneurship

7. **LIST OF TOPICS:** See following page.

**PREPARED BY:** J. Starkey  
**REVISION DATE:** June 12, 2013