Course: ENME408 – Automotive Design
Semester: Spring 2015
Day(s): Tues, Thurs
Time: 5:00 – 6:15 pm
Location: JMP2202
Instructor: Leonard Hamilton
Phone: 410-353-8475
Email: ljhamilt@umd.edu

Course Description

Course Objectives  To design, fabricate, test, analyze and compete (as a team) a competitive Formula SAE race car, as part of the SAE International Collegiate Design Series. Provide engineering students an opportunity to develop engineering skills beyond the classroom in a team oriented, competitive, and hands-on environment. Subjects encountered include:

- Systems engineering
- Strength of materials
- Kinematics
- Dynamics
- Vibrations
- Fastener basics
- Use of ADAMS software for kinematics and dynamics analysis
- Solid Works
- FEA
- Computational fluid dynamics for aerodynamics
- Basic machining
- Basic welding
- Gear and driveline design
- Test Instrumentation
- Design for manufacture
- Testing.

Prerequisites: Undergraduate thermodynamics, heat transfer, and fluid mechanics.

Course Description:

This is not a traditional college class. It is an aggressive team project class with numerous and varied individual and group assignments. Overall success is the sum of all the individual efforts, so it is critical you complete your assignments in a timely and effective manner. The team is counting on you.

The design and build of the FSAE car is led by the Team Manager in coordination with the Chief Engineer and Crew Chief.

This course requires a great deal of independent work. The advisors, mentors, and I are here to guide you, provide structure and direction, provide the necessary resources, and teach
you as appropriate. We are not here to hold your hand! This is your project. We will not be giving step-by-step instructions.

The mentors and I will not design or manufacture the car for you.

Shop cleanliness and safety will receive great emphasis. We must maintain a healthy and safe environment.

**Grading:**

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Quizzes/HW/Blogs</td>
<td>30%</td>
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<tr>
<td>Design Reviews</td>
<td>25%</td>
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<td>Design Binders</td>
<td>25%</td>
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<tr>
<td>Leadership Recs</td>
<td>20%</td>
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<td><strong>(total)</strong></td>
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Learning Outcome:

Students will learn about a broad range of automobile design topics to include vehicle dynamics, propulsion, chassis design, electrical systems and aerodynamic devices. Both theoretical and “hands on” skills will be exercised. Additionally, students will learn basic mechanical drawing, analysis and fabrication skills. Special emphasis will be placed on workplace safety, teamwork and peer leadership. Finally students will gain experience in program management to include budgeting, resource management, scheduling and solving real world “open-ended” problems.

Software: Engineering Equation Solver Program (EES) for Windows

SAE International-Collegiate Design Series

You must become a student member of SAE to participate

Collegiate Design Series and FSAE Rules are found at www.sae.org, it is your responsibility to visit the website and know the objectives and rules of the competition and program.

"The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit: http://www.studenthonor council.umd.edu/whatis.html."
Required/Recommended Textbooks

References (not required):
[5] Engineer to Win, Carroll Smith

Course Outline

1. Course Intro/overview
2. Subteam assignments
3. Subteam projects
4. Technical briefs/HW assignments
5. Design Reviews
6. Starter kits and design binders
7. Design freeze
8. Prototype Fabrication