1. **Course information:**
   ELECTRIC CAR CONVERSION  ES 166, 2 credit (1+3+0)
   Prerequisites: None
   Location: Hutchinson, 147, Meeting time: MTWHF 6pm-10pm

2. **Instructor**
   Michael Golub, Office location: TBA, Office hours:TBA
   Telephone: 907-347-4363, email: ffmig@uaf.edu

3. **Course readings/materials:**
   Course Handouts will be provided.
   Recommended:
   Convert It!, Michael Brown, 2ed, SFEAA, ISBN:1879857944

4. **Course description:** An introduction to the principles of electrical vehicle propulsion systems.
   Fundamentals of electrical motors, electrical motor controls, electrical energy storage systems, and
   automotive power-train design. The student will conduct practical design projects culminating with a
   complete electric car conversion. Relevant codes and standards will be emphasized.

5. **Course Goals:** Students completing this course will have an improved understanding of how an
   automobile can be converted to run on battery power.

6. **Instructional methods:**
   Lecture and Instructor-Interactive Lab

7. **Course calendar: (Homework, Quizzes, and Final Exam in Italic) **
   **Week 1**
   Tues, May 26:       Introductions and Shop Safety
                        Lab: Introduction to Lab Techniques
   Wed, May 27:       History of Electric Cars and Construction Overview
                        Lab: Internal Engine Preparation
   Thurs, May 28:     Removal of Internal Combustion Engine Explained
                        Lab: Remove ICE, *HW #1 assigned*
   Fri, May 29:       Preparations for Motor Installation, *Quiz #1*
                        Lab: Install Electric Motor

   **Week 2**
   Mon, Jun 1:        Power and Energy Requirements, *HW #1 Due*
                        Lab: Testing Battery Voltage, Data Analysis
   Tues, Jun 2:       Batteries and Installation
                        Lab: Machine Shop Tour, Install Battery Box
   Wed, Jun 3:        Chassis modifications, *HW #2 assigned*
                        Lab: Install Batteries
   Thurs, Jun 4:      Controllers and Installation
                        Lab: Install Controller
   Fri, Jun 5:        Charger installation, *HW #2 Due, Quiz #2*
                        Lab: Install Battery Charger

   **Week 3**
   Mon, Jun 6:        Data Logging, *HW #3 assigned*
                        Lab: Demonstration Drive
   Tues, Jun 7:       Other Transportation Systems
                        Lab: Produce Specifications
   Wed, Jun 8:        Future Technologies, *HW #3 Due*
                        Lab: Discuss Improvements to Project Car
   Thurs, Jun 9:      Group Presentations
                        Lab: Group Presentations
   Fri, Jun 10:       *Final Exam*, Group Presentations
                        Lab: Remaining Work to Complete Car and Testing

8. **Course policies:**
   You are expected to attend classes regularly. If an unforeseen circumstance prevents you from
   attending class you are expected to contact the instructor prior to the start of class. Tests must be
   taken when scheduled.
9. **Evaluation**: Plus/Minus grading will be used – see page 80 of the 2008-2009 UAF catalog for numerical equivalents in GPA.

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<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Quiz 1</td>
<td>15%</td>
<td>A</td>
<td>≥90%</td>
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<tr>
<td>Quiz 2</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
<td>B+</td>
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<tr>
<td>Group Presentation</td>
<td>30%</td>
<td>B-</td>
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<tr>
<td>Home Work</td>
<td>10%</td>
<td>C+</td>
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Evaluation of the group presentation (30% of the overall course grade) will be on a per student basis and include the following:

1) successful completion of the assigned task (5% out of the 30%)
2) the contribution of each student (5% out of the 30%),
3) written description (10% out of the 30%), and
4) oral description (10% out of the 30%).

10. **Group Presentation**:

The class will be split into teams of 3 to 4 students each and will be tasked with duplicating the process required to complete the conversion of the automobile to an electric car. These tasks include, but are not limited to: 1) motor mounting procedures 2) battery box construction in battery bank installation 3) instrumentation and data logging 4) high voltage (no voltage is applied) wiring and conduit and 5) other important installation procedures. Each student in the group is expected to contribute to the task of their group and the class in converting an automobile to an electric vehicle. Evaluation of the group presentation (30% of the overall course grade) will be on a per student basis and include the following:

1) successful completion of the assigned task (5% out of the 30%)
2) the contribution of each student (5% out of the 30%),
3) written description (10% out of the 30%), and
4) oral description (10% out of the 30%).

11. **Support Services**:

I am available (TBD) if you need further assistance with the course content.

12. **Disabilities Services**:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.