Description: **2007-2009 Catalog**
Handling qualities of two-wheeled vehicles, and the application to vehicle design. Modeling of single-track vehicles starts with the complete free-body-diagram of the steerable section and the dynamics of the vehicle. Laboratory demonstrations of geometry changes to the control spring and control authority. Determination of vehicle geometry values of c.g. position, longitudinal radius of gyration, head tube angle, ect. as their effect on handling qualities. 3 lectures, 1 laboratory. Prerequisites, ME318, ME422 or consent of instructor.

Textbook: None

Reference Books: The Chronicles of the Lords of the Chainring, W.B. Patterson
Bicycling Science, Wilson
High Tech Cycling, Burke
Bicycle Design, Burrows
Motorcycle Design and Technology, Cocco

Lecture General Information:
Assigned reading to be done before class.

There will be one midterm and a comprehensive final.

Sign up for ME 240 to use the 24hr Computer labs

Lab General Information:
The lab project in this class will consist of the design of a new bicycle. There are two main components to this design:

1) A full paper design (details to come)
2) A prototype to demonstrate handling capabilities

You must pass the safety test(s) at the Aero Hanger to use the machine shop facilities. It is strongly suggested that you begin to scrounge for bike parts wherever you can find them. The projects in this class will mostly be oriented towards looking at alternate geometry bicycles and how they can be designed with “acceptable” handling characteristics. Often this can be accomplished by taking existing bikes and cutting and welding pieces together into a new configuration.

Sign up for ME 240 to use the Aero Hanger

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Midterm Exam</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Lab</td>
<td>40%</td>
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</tbody>
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Instructor:
Andrew Davol, Ph.D. PE  Frank Owen, Ph.D. PE
Phone: 756-1388          Phone: 756-1346
email: adavol@calpoly.edu email: fowen@calpoly.edu

Office Hours:

Monday
Tuesday  11-12 pm
Wednesday  1-2 pm
Thursday  1-2 pm
Friday  11-12 pm
Topics
Control Spring and Sensitivity for Design
Lowell and Mckell Model
Patterson Control Model
Ergonomics – Joint Loads
Ergonomics – Human Power Output
Ergonomics – Power Consumption
Ergonomics – Gearing
Frame Design – External Loads
Frame Design – Materials
Frame Design – Joints
Frame Design – Internal Loads
Frame Design – Finite Element Analysis
Braking
Suspension
Front Suspension
Rear Suspension

Bike Parade Friday Dec. 2nd

Note: Thursday Dec. 1 is the “Bike Happening” if your bike is ready I will be there.