Instructor
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Office hours: Fri, 3-4p

Teaching Assistants
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Grading
The final grade will be based on homework sets, a midterm exam and a final exam.

• Homework: 50%
  Homework sets will be handed out weekly and due on Mondays by 5 pm to the box outside of 109 Steele. Late homework will not be accepted without prior permission from the instructor.

• Midterm exam: 20%
  A midterm exam will be handed out at the beginning of midterms week and due at the end of the midterm examination period. The midterm exam will be open book.

• Final exam: 30%
  The final exam will be handed out on the last day of class due at the end of finals week. It will be an open book exam.

Note: Students working on the course project will not be required to take the midterm or final. Instead, two project reports will be due documenting the experimental work performed as part of the class.

Homework policy
Collaboration on homework assignments is encouraged. You may consult outside reference materials, other students, the TA, or the instructor. All solutions that are handed in should reflect your understanding of the subject matter at the time of writing. MATLAB scripts and plots are considered part of your writeup and should be done individually.

Course Text and References
The recommended texts for the course are


You may find the following texts useful as well:


These have been put on reserve in the Sherman Fairchild Library.

**Class homepage**

Information on the class is available via the World Wide Web in the CDS 110 homepage:

http://www.cds.caltech.edu/~murray/cds110

All course handouts and other administrative data about the course will be available via the class homepage.

**Course outline**

The rough plan for the course is as follows:

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<th>Week</th>
<th>Topics</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Course overview + optimal control</td>
<td>Notes</td>
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<tr>
<td>2</td>
<td>Linear quadratic optimal control</td>
<td>Friedland Ch 9</td>
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<tr>
<td>3</td>
<td>Receding horizon optimal control</td>
<td>Notes</td>
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<td>4</td>
<td>Stochastic systems</td>
<td>Friedland Ch 10</td>
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<td>5</td>
<td>Kalman filters + midterm review</td>
<td>Friedland Ch 11</td>
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<tr>
<td>6</td>
<td>( H_\infty ) control</td>
<td>DFT Ch 2 &amp; 3</td>
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<tr>
<td>7</td>
<td>Robust stability</td>
<td>DFT Ch 4</td>
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<tr>
<td>8</td>
<td>Robust performance</td>
<td>DFT Ch 4</td>
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<tr>
<td>9</td>
<td>Design constraints</td>
<td>DFT Ch 6</td>
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<tr>
<td>10</td>
<td>Design example + final review</td>
<td>Notes</td>
</tr>
</tbody>
</table>

A more detailed course outline is available on the course web page.

**Course project**

Students interested in the implementation of control systems may opt to do a course project in lieu of the midterm and final exams. The course project will involve implementing control algorithms on a working application. For 2006, the experiment will be control of an autonomous road vehicle.