<table>
<thead>
<tr>
<th>Lecture</th>
<th>Reading (to be completed before the lecture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2 mid September</td>
<td>CKO Ch. 9, 10, 11 - Basic Electronics</td>
</tr>
<tr>
<td><strong>BasicCircuits I, BasicCircuits II, BasicOpAmps</strong></td>
<td></td>
</tr>
<tr>
<td>-1 late September</td>
<td>CKO Ch. 1.2, 3.4 - Intro, microprocessors, C code</td>
</tr>
<tr>
<td><strong>Microprocessors</strong></td>
<td>CKO Ch. 31 – Troubleshooting</td>
</tr>
<tr>
<td>0 Course Introduction</td>
<td>CKO Ch. 5 – Event Driven Programming, event checkers, State Machines</td>
</tr>
<tr>
<td>0.5 <strong>ES Framework/HSM for Lab 0</strong></td>
<td>CKO Ch. 6 – Software Design, abstraction, architecture, testing</td>
</tr>
</tbody>
</table>
| 1 Event Driven Programming, State Machines | CKO Ch. 13 – Sensors  
H+H Section 15.02 – Light levels  
15.05 – Hall effect + magnetic field |
| 2 Sensors I | (review CKO Ch. 9 – op amps)  
CKO Ch. 11 + 12 – Ideal and Real Op Amps  
H&H Ch. 4 – Op amps  
CKO 10.2, 10.3, – Diodes, BJTs  
CKO 18.7 – 555 Timers |
| 3 Filtering | CKO 14 – Signal Conditioning  
CKO 15.1 – Active Filters  
H+H Ch. 5.01-5.05 – Active filters |
| 4 Real OpAmps | CKO Ch. 11 + 12 – Ideal and Real Op Amps  
Review **BasicOpAmps** |
| 5 Statics | Course notes: Forces, Moments, and Free Body Diagrams. |
| 6 Mechanical CAD, Digital IO | CKO 29 – Rapid Prototyping  
Course Notes: Fabulous Foamcore  
CKO 16 – Digital IO |
| 7 Digital Inputs, Outputs & Power Drivers | CKO 20 – Voltage Regulators, Power Supplies, Batteries  
CKO 29.4 – Pulse Width Modulation (PWM)  
CKO 17 – Power Drivers  
CKO 15.2 – Digital Filters  
H&H Sections 9.02, 9.03, 9.04, 8.1-8.11, 8.16-8.19 |
| 8 Solenoids and DC Motors | CKO 22, 23 – Brushed DC Motors, DC Motor Control  
CKO 24– Solenoids |
| 9 DC Motor Applications | CKO 25, 26-Brushless DC Motors |
| 10 Stepper Motors and RC Servos | CKO 25, 26-Brushless DC Motors, Stepper Motors  
CKO 27-Other Actuators (RC Servos) |
| 11 Sensors II | CKO Ch. 13 – Sensors  
H+H Section 15.02 – Light levels  
15.05 – Hall effect + magnetic field |
| 12 Design Review | Skim CKO 32.1 to 21.5 – Brainstorming, Morphology  
Reread CKO Ch. 31 – Troubleshooting |
| 13 Mechanical Components | Skim Mechanical Devices for the Electronics Experimenter |
14 Project Planning and Organization
CKO 30 – Project Planning and Management
Course Notes: 4 Steps in Building a Routine, and Characteristics of High-Quality Routines

15 Modular Framework in C
Review CKO Ch. 5 – Event Driven Programming, State Machines
Review ES Framework handouts

16 Noise, Grounding & Isolation
CKO Ch. 21 – Noise, Grounding, and Isolation
H&H Sections 7.11, 7.23-7.25, 9.10 (Opto-Couplers and Relays)

17 Timers, Counters, Communications
CKO Ch. 8 – Microcontroller Peripherals
CKO Ch. 7 – Communications

18 Final Project Deadline

20 Final Robot Evaluation

21 Public Robot Competition
Public Demo location and date TBD
(post public demo class outing TBD)

22 Course Review and Lab Clean Up

Note that all dates are tentative and will be adjusted during the quarter. See website for all true dates.

**LAB DESCRIPTIONS**

<table>
<thead>
<tr>
<th>Number</th>
<th>Material</th>
<th>Pre-Lab Due Date</th>
<th>Lab Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab 0</td>
<td>Event Driven Programming: The Cockroach</td>
<td>01/Oct/2017</td>
<td>06/Oct/2017</td>
</tr>
<tr>
<td>Lab 1</td>
<td>Analog Signal Conditioning, Filtering</td>
<td>08/Oct/2017</td>
<td>16/Oct/2017</td>
</tr>
<tr>
<td>Lab 2</td>
<td>Mechanical and Electronic Prototyping</td>
<td>17/Oct/2017</td>
<td>23/Oct/2017</td>
</tr>
<tr>
<td>Lab 3</td>
<td>DC &amp; Stepper Motors</td>
<td>24/Oct/2017</td>
<td>30/Oct/2017</td>
</tr>
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**FINAL PROJECT**

Checkoff: In lab demonstration of full functionality
Location: BE-138
Date: 05/Dec/2017

Public Demo: Public competition. 6:00 – 8:30 PM
Location: Media Theater 110
Date: 08/Dec/2017

Final report: Team report on the final project, submit electronically
Date: 13/Dec/2017

**EXAMINATIONS**

Quizzes: Weekly, on the required reading, in class
Date: 01/Nov/2017

Midterm: Take Home, Out on Wednesday, after review session, Due Monday, by noon.
Date: 06/Nov/2017