Key Policies

• Textbook: “Linear Circuits”, 3rd Edition, DeCarlo & Lin

• Communication:
  – Blackboard: http://www.itap.purdue.edu/learning/tools/blackboard/
  – Email: pbermel@purdue.edu

• Full list of policies given on handout; also available under Syllabus on Blackboard
Grading

<table>
<thead>
<tr>
<th>Grading Item</th>
<th>Points</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam #1</td>
<td>100</td>
<td>9/19/12</td>
</tr>
<tr>
<td>Exam #2</td>
<td>100</td>
<td>10/17/12</td>
</tr>
<tr>
<td>Exam #3</td>
<td>100</td>
<td>11/15/12</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
<td>TBA</td>
</tr>
<tr>
<td>Homework</td>
<td>100</td>
<td>8/22/12-12/7/12</td>
</tr>
<tr>
<td>TOTAL</td>
<td>600</td>
<td></td>
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</tbody>
</table>

- Numerical grades of 60% or above will pass (barring cheating)
- Roughly speaking: A’s will be 90% +; B’s 80-89%; C’s 70-79%
- Final letter grades will be assigned at my discretion
Homework

• Homework is absolutely essential to learn the material & prepare for exams
• 40 total (short) homework assignments this semester; lowest 4 dropped
• Due at 4:30 pm on the listed date at EE 325B
# Exams

<table>
<thead>
<tr>
<th>Exam #</th>
<th>Date</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam #1</td>
<td>9/19/12</td>
<td>Lectures 1-11; Chapters 1-3; 5</td>
</tr>
<tr>
<td>Exam #2</td>
<td>10/17/12</td>
<td>Lectures 12-21; Chapters 6-8, except 6.5 and 8.8</td>
</tr>
<tr>
<td>Exam #3</td>
<td>11/15/12</td>
<td>Lectures 22-33; Chapters 9, 4, 6.5, 8.8, 10</td>
</tr>
<tr>
<td>Final Exam</td>
<td>TBA</td>
<td>Lectures 1-40; Chapters 1-11</td>
</tr>
</tbody>
</table>

- Exams will be multiple choice
- Given in the evenings
- Will get a day off from class
Getting Help

- Most material posted on Blackboard
- Contact your peers, TAs or me through the messaging system
- ECE 201 Help Room: EE 026
  - Staffed by course TAs
  - Open most business hours: 8:30 am – 5 pm, Monday through Friday
Key Definitions

- **Circuit** – an energy processor
- **Charge** – electrical property of matter (C)
- **Elementary charge** – \(1.602 \times 10^{-19} \text{ C}\)
- **Current** – net flow of charge per unit time (A)
- **Conductor** – allows the flow of current
- **Insulator** – impedes the flow of current
Example 1: Current Flow

• Semiconductor slab:
  – Electrons: -1 μC/cm, -5 km/s
  – Holes: 10 μC/cm, 2 km/s

• Total current:
  \[ I = (-1 \ \text{μC/cm})(-5 \ \text{km/s}) + (10 \ \text{μC/cm})(2 \ \text{km/s}) \]
  \[ = 0.5 \ \text{A} + 2 \ \text{A} \]
  \[ = 2.5 \ \text{A} \]
Types of Current

• Direct current (DC)
  – Constant stream of current over time
  – Example: AA batteries

\[ I(t) \]

\[ t \]

• Alternating current (AC)
  – Sinusoidally oscillating stream of current over time
  – Example: wall plug outlet offers 60 Hz AC

\[ I(t) \]

\[ t \]
Example 2: Calculating Current from Charge

\[ I(t) = \frac{dq}{dt} \]
Example 3: Calculating Charge from Current

\[ q(t) = \int I(t) \, dt \]
Key Formulas to Calculate Current from Charge

\[ \frac{d}{dt} t^n = nt^{n-1} \]

\[ \frac{d}{dt} \sin \omega t = \omega \cos \omega t \]

\[ \frac{d}{dt} \cos \omega t = -\omega \sin \omega t \]

\[ \frac{d}{dt} e^{-t/\tau} = -\frac{e^{-t/\tau}}{\tau} \]
Key Formulas to Calculate Charge from Current

\[ \int t^n \, dt = \frac{t^{n+1}}{n+1} + C \]

\[ \int \sin \omega t \, dt = -\frac{\cos \omega t}{\omega} + C \]

\[ \int \cos \omega t \, dt = \frac{\sin \omega t}{\omega} + C \]

\[ \int e^{-t/\tau} \, dt = -\tau e^{-t/\tau} + C \]
Homework for Wednesday

• DeCarlo & Lin, 3rd Edition, Chapter 1
  – Problem 5
  – Problem 7(b)
  – Problem 8

• All assignments for the semester in your handout and posted on Blackboard