<table>
<thead>
<tr>
<th>Required Course:</th>
<th>ECE 55400 Introduction to Electronics Analysis and Design</th>
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<tr>
<td>Credit and contact hours:</td>
<td>(3 cr.) Class 3</td>
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<tr>
<td>2014-16 IUPUI Campus Bulletin description:</td>
<td>ECE 55400 Electronic Instrumentation and Control Circuits (3 cr.) P: ECE 25500 and ECE 30100 or Graduate Standing. Class 3. Analysis and design of special amplifiers, pulse circuits, operational circuits, DC amplifiers, and transducers used in instrumentation, control, and computation.</td>
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<tr>
<td>Prerequisite or corequisite:</td>
<td>ECE 255: Electronic Circuits, Analysis and design</td>
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<td>Prerequisites by topic:</td>
<td>High and low frequency models of various BJT and MOSFET configurations (ECE255)</td>
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<td>Textbook:</td>
<td>ECE554 Lecture Notes: By L.L. Ogborn from Purdue West Lafayette, 2005</td>
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<td>Coordinator:</td>
<td>Maher E. Rizkalla, Professor of Electrical and Computer Engineering</td>
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<td>Goals:</td>
<td>To teach students the control tools used in the design of electronic Circuits beyond the limits in high frequency stability, gain compensation, and noise optimization. To apply the control tools in the design of video amplifiers using Base Compensation techniques. To design and analysis switching regulators for optimum performance.</td>
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<tr>
<td>Topics:</td>
<td>1. Device reviews and DC and AC amplifier models One week 2. High frequency amplifiers and the sag algorithms One week 3. Rise time limitations</td>
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One week
4. Applications of control tools in electronics circuits
   One week
5. The intrinsic feedback of high frequency devices.
   One week
6. High frequency stability, compensation tools, and the use of Linville plan
   Two weeks
7. Algorithm of high frequency stability
   One week
8. Noise in electronic circuits and optimization techniques
   Two weeks
9. Feedback in analog design
   Two weeks
10. Video amplifier design
    One week
11. Switching regulators
    Two weeks
One week for Mid term exam

**Computer usage:**
- PSpice Circuit Simulation
- Frequency stability software developed for the class

**Laboratory projects:**

**Evaluation methods:**
- Two mid term exams (40%), Design project (10%), 10 homework assignments (10%), and a comprehensive final exam (40%).

**ABET category:**
- Engineering science 1.5 credit (50%) and Engineering design 1.5 credit credits (50%)

**Prepared by:**
- Maher E. Rizkalla

**Date:**
- March 20, 2009