國立臺灣大學電資學院電機學群開授課程大綱格式

<table>
<tr><td>所別：電子所</td><td>組別：ICS</td><td>修習年級：大四、研究所</td><td>每週演講時數：3</td></tr>
<tr><td rowspan="3">課　　程</td><td colspan="3">☑1.一般性課程（含必修、選修）　□2.通識教育課程【　　】(1)人文　(2)社會　(3)物質　(4)生命
□3.教育學程　　□4.軍訓課程　　□5.體育課程</td></tr>
<tr><td>課號：EE5054</td><td>班次：　01</td><td>學分：3</td></tr>
<tr><td colspan="3">中文名稱：高速介面積體電路設計　　英文名稱：High-Speed I/O IC Design</td></tr>
<tr><td>授課教師</td><td colspan="3">陳信樹</td></tr>
<tr><td>課程大綱

一.內容

二.教科書

三. 成績評量方式

四. 預修課程

(每行 30 個中文字,全文限 800 個中文字,即 1600 個英文字)</td><td colspan="3">一 內容
The course is intended to give students an understanding of the fundamental electrical issues involved in the design of high-speed I/O and a mastery of the basic techniques and methods used to deal with these issues. Issues will be introduced in the areas of signaling, noise-management, power distribution, timing, and synchronization. In each area, the fundamental problems will be introduced and engineering solutions to these problems discussed. At last, typical signaling circuits will be introduced.

1 Overview of noise, signaling, power distribution, and timing issues.
2 Transmission line: Electrical models of wires. Lossless transmission line. Lossy lines. Multidrop buses. Balanced lines. Common and differential mode analysis. Time domain reflectometry (TDR).
3 Noise: Power supply noise. Crosstalk. Inter Symbol Interference (ISI). Managing noise. Noise budgets and Bit Error Rate (BER).
4 Signaling: Transmission modes. Differential signaling. Signaling over capacitive lines. Signaling over inductive lines. Signal encoding. Advanced signaling.
5 Power distribution: Load currents. Supply networks. Bypass capacitors. Local regulation. On-chip power distribution.
6 Timing: Signals, values, and events. Clock domains. Timing uncertainty: skew and jitter. Closed-loop timing: Measuring and canceling skew. Clock distribution: Off-chip distribution. On-chip distribution.
7 Signaling circuits: Terminations. Transmitter circuits. Receiver circuits.

二 教科書

“ Digital Systems Engineering” by William J. Dally and John W. Poulton, Cambridge 1998.

參考書

“High-Speed Signal Propagation” by H. Johnson & M. Graham, Prentice Hall 2002.
“Noise Reduction Techniques in Electronic Systems” by Henry W. Ott, Wiley, 2nd Ed. 1988.

三 成績評量方式

Homework (20%) + One Examination (30%) + Project (50%)

四 建議預修課程

Electromagnetics, Microelectronics, Electric Circuits</td></tr>
<tr><td>更新日期</td><td colspan="3">106　年　2　月　24　日</td></tr>
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