

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Department of Electrical and Computer Engineering

Assignment #1

Due Date: Feb 2, 2011

Weekly Reading Assignment Reminder: Read the reference papers posted under each week.

1. The objective of this exercise is to prepare a detailed timeline (from the early years of CMOS) indicating the introduction of various *materials* in the VLSI technology. Please indicate and discuss the following:
 - i) reason(s) leading to their introduction
 - ii) their impact on device/interconnect/circuit performance, power dissipation and reliability
2. a) The objective of this exercise is to prepare a timeline summarizing the *power consumption* and *energy per switching operation* of various electronic *devices*, from vacuum tubes to BJTs to NMOS/CMOS. Be sure to indicate the following:
 - i) mechanism(s) of power/energy consumption
 - ii) reason(s) for excessive power/energy loss near the end of each device generationb) Prepare a separate timeline for CMOS based *products* (such as microprocessors). Indicate what measures/techniques have been introduced over the years at the technology, device, circuit, microarchitecture and system/package levels to curb power dissipation. What are the major roadblocks to further reduction of power dissipation?