

DIGITAL INTEGRATED CIRCUITS

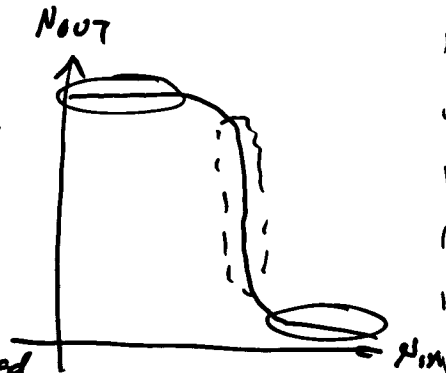
INTRODUCTION

Course -

Objective - Design of digital circuits is DSM technologies.

Goals for the course:

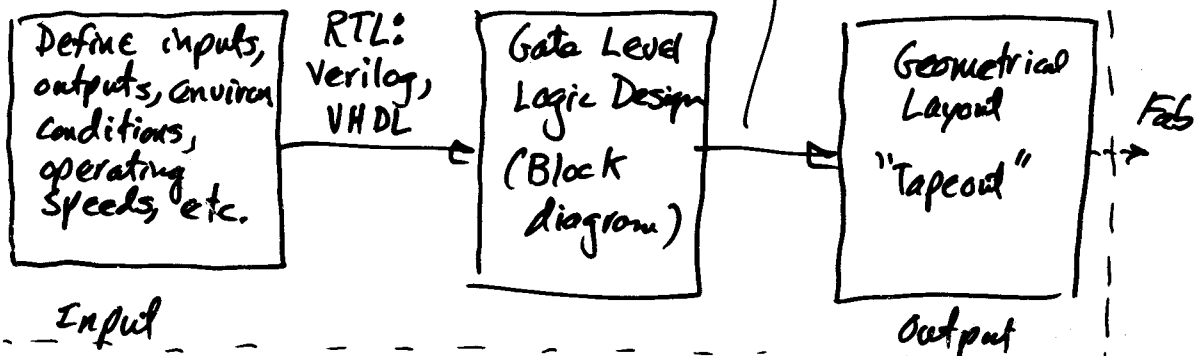
- Develop the models & intuition needed to be able to analyze existing digital ckt's, and create new ones.
- Examine actual ckt's designed in industry and learn how to make design tradeoffs between speed, power and reliability.
- Develop the understanding needed to anticipate the likely improvements and potential difficulties that will be encountered in future designs.
- Provide the basis and foundation for other courses.



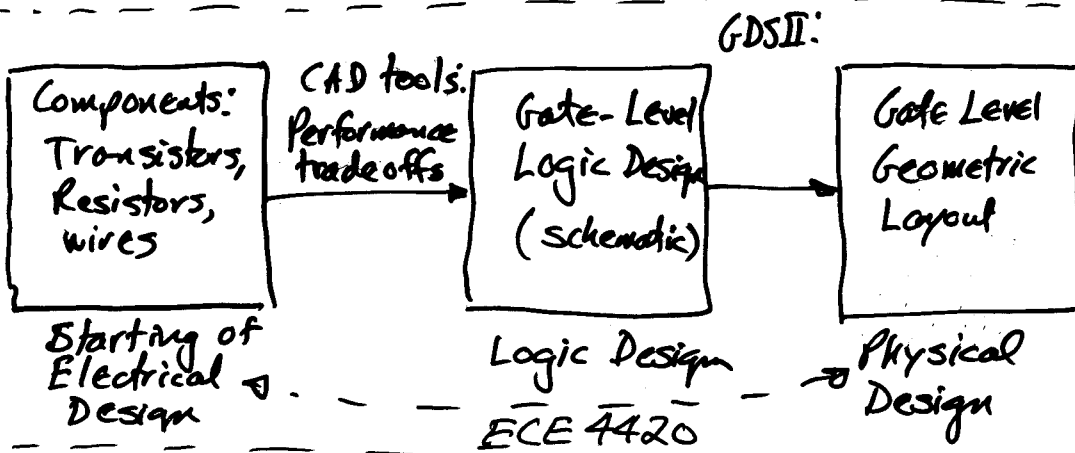
Design

Systems Level

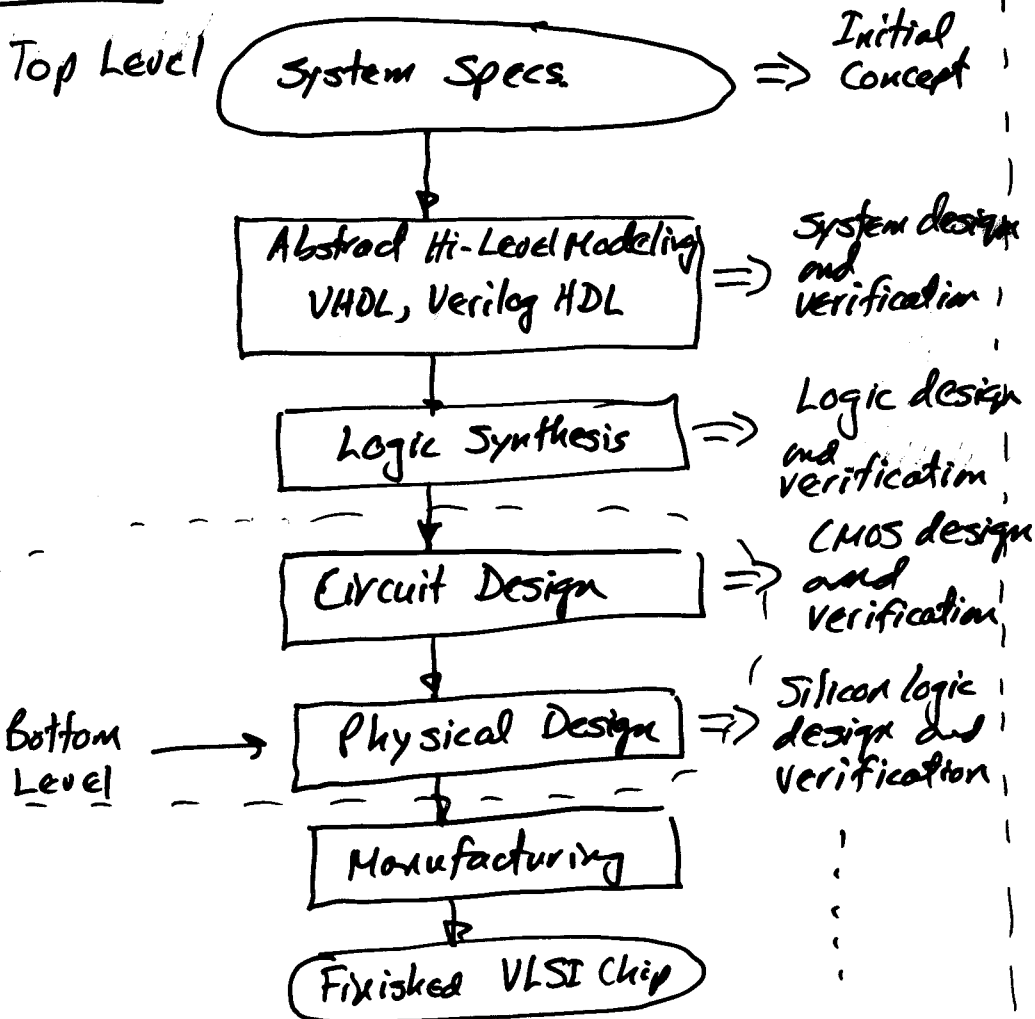
GDSII: Std. format
for describing geometric
objects



Circuits Level



Design Flow



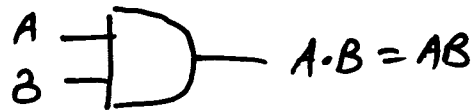
Review of Digital Gate Logic Design

Basic Logic Functions

1.) Inverter (NOT)



2.) AND ("·")



3.) NAND

4.) OR ("+")



5.) NOR

6.) XOR



7.) NXOR

De Morgan's Laws

$$\overline{A+B} = \bar{A} \cdot \bar{B}$$

$$\overline{A \cdot B} = \bar{A} + \bar{B}$$

Sequential Logic Circuits

A digital circuit whose outputs are determined by both present input and the results of a previous event.

Flip flops

D

JK

RS

Etc

Example -

Positive-edge triggered FF

See text

✓