

Overview of what you will learn in CHFEN 5655 & 6655 Silicon Chip Processing

Materials' Properties

- Structure – Metals, Oxides, Semi-conductors

- Electrical Properties – Metals, Oxides, Semi-conductors

- Other Properties – Piezo, magnetic, ferro-electric

Device Physics

- Conductor

- Resistor

- Capacitor

- Diode

- Transistor

Chip Devices

- Structures

 - Memory

 - CPU/Switches

Multi-layer Interconnects

- Structures including barrier layers

- Limits on Computer speed

Chemical Engineering in Processing of Silicon Chips

- Wafer Fabrication

- Doping Wafers

 - Diffusion

 - Implantation

- Patterning

 - Spin Coating

 - Photo-resist Development

 - Photo-resist dissolution

 - Etching

 - Deposition

 - Oxides

 - Silicon

 - Metal

- Multi-layer Interconnects

 - Patterning

 - Deposition

 - Chemical Mechanical Polishing/Planarization

What Can Go Wrong?

- Understanding the electrical problem in terms of chip processing.

- Understanding what causes the problem

- Developing a solution to the problem

- Developing a strategy so that the problem will not occur again.