Microelectronic Device Fabrication II (PH446/546) syllabus

Prerequisite: PH 545/445 or consent of instructor.

Syllabus

Metallization
I. Interconnects
1. Material properties, Resistivity parameters, RC constant
2. Metal/semiconductor contacts.
4. Al interconnects
- Failure mechanisms
- electromigration
- Blech effect
- Stress induced voids
5. Metal/ silicon interface. Formation of silicides, salicides, and polycides
7. Tungsten CVD
8. Copper interconnects, electrodeposition, CMP, damascene, dual damascene.

Mid-term exam

Thin film deposition
II. Chemical vapor deposition
1. Amorphous films, properties
2. Polycrystalline films. TFTs.
3. Epitaxial films: Si and SiGe, HBTs, HEMTS.
4. Autodoping, buried layers.
5. Selective epitaxy, SOI, Simox, SOI devices: FDSOI, PDSOI.
6. SiO₂, PSG, BPSG, Si₃N₄, SiON, and STI.
7. Thin gate oxides, high-k dielectrics.
8. Multilevel metallization.

Final exam.