ECE 512 / ChE 572: Semiconductor Process Integration

TR 10-11:20 am, Batcheller 250
Winter 2008

Instructor: J.F. Conley, (737-9874, KEC 3089, jconley@eecs.oregonstate.edu)
Office hours: After class *or by appointment.*

Prerequisite: ECE 511, or Fundamentals of Semiconductor Materials Processing equivalent

Texts: 1) S. Wolf, Silicon Processing for the VLSI Era, Vol. 2: Process Integration, (1990). [Required]
2) D.C. Montgomery, Introduction to Statistical Quality Control, 5th ed., (2005). [Recommended]
3) S. Wolf and R. Tauber, Silicon Processing for the VLSI Era, Vol. 1: Process Technology, 2nd ed., (2000). [Supplementary (ECE 511 textbook)]

Software

1. Statgraphics (statistical quality control commercial software package)
2. Silvaco (process simulation commercial software package)

Course Outline

1. Process integration overview / statistical background (1 class, W Ch. 1, M. Ch. 1, 2-1, 2-3.1)
2. Statistical process control (SPC) – (2 classes, M Ch. 3, 4, 5, 7.3)
3. Design of experiments (DOE) – (3 classes, M Ch. 12, 13-1)
4. Process simulation (1 class, W Ch. 9)
5. Isolation Technologies (1 class, W Ch. 2)
6. Metallization technology (2 classes, W Ch. 3 + Wolf/Tauber Ch. 15)
7. Multilevel interconnection (1 class, W Ch. 4 + Wolf/Tauber Ch. 15)
8. NMOS process integration (1 class, W Ch. 5)
9. CMOS process integration (1 class, W Ch. 6 + Wolf/Tauber Ch. 16)
10. Bipolar / BiCMOS process integration (1 class, W Ch. 7)
11. Semiconductor memory process integration (1 class, W Ch. 8)
12. Process integration (1 class, guest lecture)
13. Reliability (1 class, class notes)

Grading

1. SPC / DOE Project (Due Thursday, Jan. 31st @ 5:00 pm)	25%
2. SUPREM Project (Due Thursday, Mar. 13th @ 5:00 pm)	25%
3. Midterm (closed book), Tuesday, Feb. 12th (SPC, DOE, process simulation)	25%
4. Final (closed book), Monday, Mar. 17th @ 9:30am (isolation, metallization, interconnection, process integration, reliability)	25%