

CHFEN 5655-001 meets with 6655-001

Title: Silicon Chip Processing

Units: 3 Days taught: T, H Time: 10:45 am - 12:05 pm, Room EMRL 241.

Instructor: T. A. Ring, MEB 2290, ring@eng.utah.edu, 585-5705

The focus of this course is to give chemical engineers: 1) the basics of semiconductor materials and their properties, 2) basics of device physics, structure and electrical properties, 3) the vocabulary of the industry and 4) to translate the chemical engineering fundamentals, already learned in mass transfer, heat transfer and reaction kinetics, to problems in semiconductor processing. The steps to be emphasized include: crystal growth, diffusion, implantation, photolithography with emphasis on light induced reactions in photo-resists, deposition methodologies with emphasis on chemical vapor deposition of various materials and chemical mechanical polishing. In addition to teaching quantitative ways of process analysis, this course will focus on how defects are minimized in these processing steps.

Books

Required

“The Physics of Solids” by Richard Turton, Oxford University Press, 2000.

Suggested

[“Silicon VLSI technology : fundamentals, practice and modeling / James D. Plummer, Michael Deal, Peter B. Griffin](#)

[“VLSI planarization : methods, models, implementation / by V. Feinberg, A. Levin, and E. Rabinovich](#)

[“Basic VLSI design / Doug A. Pucknell and Kamran Eshraghian](#)

[“Resists in microlithography and printing / Bohumil Bednár, Jaroslav Králíček, and Jaromír Zachoval ; with contributions by Andrei V. Yel'tsov and Tat'viana A. Yurre](#)

[“Multilevel interconnect technology / Gopal K. Rao](#)

[“Introduction to VLSI process engineering / edited by the Society of Chemical Engineers of Japan ; editor in chief, Yuji Nakai.](#)

[“Dry etching for VLSI / A.J. van Roosmalen, J.A.G. Baggerman, and S.J.H. Brader](#)

[“Planar processing primer / George E. Anner](#)

[“Microcircuit production technology / Douglas F. Horne.](#)

[“Microlithography : process technology for IC fabrication / David J. Elliott.](#)

Grades for 5655

2 - Mid-term Exams (1-Material Properties, 2-Chip Chemical Processing)

30% of grade for each mid-term exam

Homework

20% of Grade

Final Exam

20% of grade

Grades for 6655

2 - Mid-term Exams (1-Material Properties, 2-Chip Processing)

30% of grade for each mid-term exam

1- Oral Presentation (on Materials Properties – not covered in lecture)

10% of Grade

Homework

10% of Grade

Final Exam

20% of grade

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