ELEC 5820/6920 Exam 1 Study Guide

I.   MEMS and Microfabrication Terminology

Know terms such as: MEMS, isotropic, anisotropic, undercut, mask, aspect ratio, Bosch process, native oxide, hydrophilic, hydrophobic, stiction, sacrificial layer, etc…

II.   Topics

1) Miniaturization and scaling (surface effects, volume effects,…)
2) Energy domains and example devices for each
3) Cleanroom class
4) How Si wafers are made (CZ and FZ)
5) Photolithography process
6) Bulk and Surface Micromachining
7) Grayscale lithography
8) Single crystal Si (FCC, Miller Indices and notation, crystal planes & characteristics, flats & wafer identification…)
9) Wet etching (3 etchants, etching features into (100) wafers, hillocks, mesas, …)
10) Plasma (definition, Paschen curve, sputtering)
11) Dry etching (plasma etching, ion milling, RIE, DRIE)
12) Wafer bonding (fusion, anodic, high temp, adhesive, eutectic, low temp, CMP)
13) SOI wafers (structure, materials, SIMOX, basic MEMS processing with)
14) Thin film deposition (sputtering, evaporation, LPCVD, PECVD, thermal oxidation, plating, spin-on)
15) Triple point drying, critical point drying

III.   How to study

a. Homework questions/problems
b. Class notes (my notes are on the class website)
c. Text book (optional)

IV.   Likely test format
a. Short answer
b. Matching
c. Problems
d. Identify/Label the drawing
e. A bonus problem (anything covered in class is fair game)

V.   Things to watch out for:

a. Units on answers and in the units asked for
b. Label axes on graphs
c. Answer all parts of questions
d. Show calculations
e. Convert parameters to a common unit before calculating the answer

VI.   **Test Is Closed Book, Closed Notes, No Laptop/Notebook PC's**