

Know the following:

1. Know the basic history of MEMS and know why silicon is so important.
2. Basic relationships of crystallographic planes and why they are important in MEMS
3. Know how silicon wafers are prepared, and what the basic dopants are.
4. Basic materials science such as stress, strain, toughness, and how these parameters vary between material types.
5. Understand the important parameters in photolithography including: the difference between positive and negative resists, how resolution is determined, the influence of light intensity and frequency, and what the various photoresists might be used for.
6. Know the steps in the photolithography process and what the purpose of each step is.
7. Understand the differences between mask types and how masks can be designed.
8. Know the different types of dry etching systems and the advantages and disadvantages of each. This includes RIE, plasma, DRIE, reverse sputtering, etc. Be prepared to explain which method you would use to etch common MEMS materials (such as silicon, silicon dioxide, and silicon nitride) and why.
9. Know the important issues related to etching such as what determines: etch rate, anisotropy, selectivity, and surface finish. Understand the different types of etch stops.
10. Know the different types of thin film deposition systems discussed in class so far (CVD, oxidation, diffusion, etc.) and the advantages and disadvantages of each. Be prepared to explain which method you would use to deposit or grow common MEMS materials and why.
11. Know how basic parameters such as temperature, pressure, relative gas concentrations, and technique determine the deposition rate and quality. Know which methods produce the highest quality films.
12. Know the difference between surface and bulk micromachining.
13. Know what a sacrificial and/or lift off process is.
14. Know the difference between ion implantation and diffusion, and the usefulness of both.
15. Be prepared to complete or explain a microfabrication process diagram, or how you might go about some microfabrication activity using the methods that have already been discussed in class.

Read pages 1-113 in the class textbook or equivalent info in other texts.