

Lecture 5: Process Modules I

- **Announcements:**
- HW#1 due Thursday, 2/7 at 9 a.m.
- Lecture Modules 3 & 4 on Process Modules online
- Process Module Details lecture videos online
 - ↳ These give more details than I will give in class
 - ↳ Watch these if your background in microfabrication is weak
 - Very helpful for homework (& research)
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- **Today:**
- Reading: Senturia, Chapter 1
- Lecture Topics:
 - ↳ Benefits of Miniaturization
 - ↳ Examples
 - GHz micromechanical resonators
 - Chip-scale atomic clock
 - Micro gas chromatograph
- Senturia, Chpt. 3; Jaeger, Chpt. 2, 3, 6
 - ↳ Example MEMS fabrication processes
 - ↳ Photolithography
 - ↳ Etching
 - ↳ Oxidation
 - ↳ Film Deposition
 - ↳ Diffusion
 - ↳ Ion Implantation
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- **Last Time:**
- Finished Chip-Scale Atomic Clock
- Now, continue with Module 2 slides 30-48

Process Module Overview:

- **Lecture Topics:**
 - ↳ Photolithography
 - ↳ Etching
 - ↳ Oxidation
 - ↳ Film Deposition
 - ↳ Diffusion
 - ↳ Ion Implantation
- As stated earlier, this is now assumed knowledge
- I will gloss over this material to review it a bit, but will not go over it in detail
- You can watch my lectures from EE245, Fall 2012, on the Webcast Berkeley site for more in depth coverage: Lectures 6-8

Process Modules

- ⇒ there are actually only a few basic modules used for processing
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- Combination of these in the correct sequence yields an integrated circuit technology that provides transistors, MEMS, nanodevices, etc.
- ⇒ For each module, need to understand:
- ① Physics and engineering of each module in detail.
 - ② Interactions between modules.
 - ③ The effect of each module on the finished device.



