NE 343 Microfabrication and thin-film technology  
ECE 433 Fabrication technology for micro & nano devices  
ECE 730 Advanced technology for semiconductor processing  
University of Waterloo  
Nanotechnology Engineering Program  
Spring 2021

Lectures: No live lecture, at least 2 online office hours per week

Tutorials: TA can give live tutorial to solve assignment/exam questions if there is the need

Instructor: Dr. Bo Cui  
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Course Content  
This course provides an overview of various microfabrication technologies utilized in modern VLSI semiconductor fabrication. They are also widely utilized for other micro-devices such as MEMS, microfluidics, sensors, data storage (hard drive).

Topics:  
1. Introduction to semiconductor devices and technology  
2. CMOS fabrication process overview  
3. Crystal growth, wafer fabrication  
4. Clean room, wafer cleaning and gettering  
5. Lithography  
6. Thermal oxidation  
7. Dopant diffusion  
8. Ion implantation  
9. Thin film deposition  
10. Etching.

Note that these topics are in the same order as the textbook chapters. Most topics take ~1 week to cover; yet thin film deposition and etching will each take ~2 weeks.
Textbook
Note that this is a big book. But you shouldn’t be scared by its size; since for most chapters we will cover only the first half or so of that chapter (i.e. we won’t cover Models and Simulations very much). The technical content is not up to date (since the book was published in 2000). If you want to learn start-of-the-art fabrication technology, you should consider taking NE353 (nanofabrication), also taught by me, in the Fall term.

Reference:
You are not encouraged to read the reference unless you have read and understand very well the textbook. The textbook is much better written (clearer concept) than the reference, yet the reference is closer to textbook style (easier to read).

Course Web Site:
A course homepage is available on UW LEARN.

Course Grading Criteria
- Assignment 15%
- Project/presentation 15%
- Five quiz (best 4 counted) 40%
- Final Exam 30%

For assignment, you must do it by yourself (though you are allowed to talk to others to get some hint), as this will help you a lot for your quiz/exams.
The quiz/exam will be open book. You must do it all by yourself (cannot talk to others to get help).