ECE6229 Introduction to MEMS Fall 2011

Text Books:

"Fundamentals of Microfabrication and Nanotechnology," Third Edition by M. Madou, CRC Press, 2010.

References:

"An Introduction to Microelectromechanical Systems Engineering," 2nd Edition by N. Maluf and K. Williams, Artech House Inc., 2004.

"Silicon Processing for the VLSI Era – Volume 1 Process Technology," by S. Wolf and R.N. Tauber, Lattice Press, 2002.

"The Science and Engineering of Microelectronic Fabrication," by S. A. Campbell, Oxford, 2001 (2nd Edition)

Lecture Time: MW 3:05am – 3:55am
Place: TBD

Lab: Wed, Th or Fri 9:05am – 11:55am
Marcus Technology Building Clean Room
MiRC Clean Room SEM Microscopy and AFM Laboratory

Instructors:

Bruno Frazier or Todd Sulchek,
Room 203 MiRC Room 310, Love Building,
e-mail: Bruno.Frazier@ece.gatech.edu Todd.Sulchek@me.gatech.edu;

Grading: Homework: 10%
Exam I: 25%, Exam II: 25%,
Lab: 30%
Term Paper: 10%

Honor Code: http://www.honor.gatech.edu

		FALL 2011		
		ECE 6229 Introduction to MEMS	Madou	Homework
Date	Lecture	Topic	Book	Project
8/17/2011	*1*	Introduction and scaling laws	9	
8/19/2011	*2*	Introduction to lithography	1	
8/24/2011	*3*	Mask aligner and imaging optics	1	
8/26/2011	*4*	Resolution in photolithography and mask layout	1	A1
8/31/2011	**5**	Structure of silicon and properties		
9/2/2011	**6**	Oxidation and diffusion	4	D1,A2
9/7/2011		**Labor day**	3	
9/9/2011	**7**	Nucelation and growth	3, 5	D2,A3
9/14/2011	*8*	Evaporation	3	
9/16/2011	*9*	Sputtering	3	D3, A4
9/21/2011	*10*	CVD	3	
9/23/2011	*11*	PECVD	3	D4, A5
9/28/2011	**12**	Atomic Layer Deposition	-	
9/30/2011	**13**	Polysilicon	5	D5
10/7/2011	**14**	Wet etching	2	
10/12/2011	**15**	Surface micromachining	5	
10/14/2011		Bulk micromachining processes		
10/19/2011	**16**	Corner compensation and etch stop	4	PA
10/21/2011	**17**	**Midterm**	4	A6
10/26/2011	**18**	Vacuum physics and kinetic thoery		
10/28/2011	19	Plasma etching	2	D6,A7
11/2/2011	*20*	Deep RIE etching	2	
11/4/2011	*21*	Characterization Methods	8	D7,A8
11/9/2011	***22***	Wafer anodic bonding and local bonding	6	
11/11/2011	***23***	Stereolithography	6	D8,A9
11/16/2011	24	PDMS and SU-8 MEMS processing	-	
11/18/2011	25	Electroplating metals	-	
11/23/2011	**26**	MEMS/NEMS Sensors	6	D9,A10
11/25/2011	27	Microcantilever Fabrication Processes	10	
11/30/2011	*28*	Student presentations	10	D10
12/2/2011	29	Student presentations	-	
12/7/2011		**Final Exam**		PD
		Project - critical review of MEMS processing		
	Lab	LABORATORY EXPERIMENTS FOR MEMS CLASS		
	1	Lab safety and clean room protocol and wafer cleaning		
	2	Parylene deposition/PDMS molding		
	3	CAD and Mask Making		
	4	Electroplating		
	5	Photolithography		
	5	Silica Etching and Bulk Silicon Micromachining		
	6	Characterization Methods		
	7	Aluminum deposition		
	8	Anodic bonding		

		Q - Quiz		
		A - Homework Assigned		
		P - Project		
		D - Homework Due		