

PME 4352 微機電系統導論

Fall 2011

Credits : 3

Time : F5F6F7

Place : 工一館 431 室

課程內容

1. Introduction

2. IC/MEMS fabrication process modules

- Deposition
- Photo-lithography
- Etching

3. Process integration for MEMS

- Bulk micromachining
- Surface micromachining
- LIGA
- Hybrid
- High-aspect-ratio micromachining (HARM)

Exam

4. Applications

5. Mechanics issues on MEMS

Final project

Instructor : 方維倫

Office : 工一館 522 室 (分機 42923)

Lab : 工一館 532 室 (分機 33742)

Email: fang@pme.nthu.edu.tw

Grading : Homework 10%, Midterm 50%, Final project 40%

Reference books (many MEMS books are available after 2005)

- MEMS general concept
 - (1) Fundamentals of microfabrication by M. Madou, 1997
 - (2) Micromechanics and MEMS edited by W.S. Trimmer, 1997
 - (3) Microsystem technology and microrobotics, S. Fatikow and U. Rembold, 1997
 - (4) MEMS and MOEMS Tech. and Applications, edited by P. Rai-Choudhury, 2001

- Fabrication technology and material properties
 - (1) VLSI 製造技術 莊達人 編著, 1994
 - (2) Thin film process edited by J.L. Vossen and W. Kern, 1978
 - (3) Semiconductor IC processing technology by W. R. Runyan and K. E. Bean, 1990
 - (4) The materials science of thin films by M. Ohring, 1991
 - (5) VLSI technology by S.M. Sze, 1988

- Microsensors and microactuator
 - (1) Microactuators by M. Tabib-Azar, 1998
 - (2) Micromachined transducers by G.T.A. Kovacs, 1998
 - (3) Microsystem design by S.D. Senturia, 2001
 - (4) Microsensor by J.W. Gardner, 1994
 - (5) Semiconductor sensors by M. Sze, 1994
 - (6) Microsensor edited by R.S. Muller et. al., 1991
 - (7) Silicon Sensors, S. Middelhoek and S.A. Audet, 1989
 - (8) Biosensor: Microelectrochemical devices by M. Lambrechts and W. Sansen, 1992

Journal

- (1) Journal of Micromechanics and Microengineering
- (2) IEEE/ASME Journal of Microelectromechanical Systems
- (3) Sensors and Actuators A/B
- (4) IEEE Transactions on Electron Devices
- (5) IEEE Sensors Journal
- (6) Lab on Chip
- (7) Journal of Micro/Nanolithography, MEMS, and MOEMS
- (8) Microsystem Technology
- (9) Journal of Vacuum Science and Technology
- (10) IEEE/ASME Transactions on Mechatronics

Conference proceeding

- (1) IEEE MEMS
- (2) Transducers
- (3) IEEE Sensors
- (4) Eurosensors
- (5) μ TAS
- (6) HARMST
- (7) SPIE Symposium on Micromachining and Microfabrication