EE6601 ADVANCED WAFER PROCESSING

Acad Unit: 3
Prerequisite: Nil
Effective: Acad Year 1999-2000
Last update: 15 Aug 2001

OBJECTIVE

1. To study deep sub-micron front end process technology
2. To study deep sub-micron back end process technology
3. To study characterization techniques relevant to deep sub-micron process technology

DESIRED OUTCOME

The students will be exposed to state-of-the-art advanced ULSI process technologies . They will also be exposed to future technology. They will also become more familiar with the relevant diagnostic techniques for process related issues.

OTHER RELEVANT INFORMATION

Prior knowledge required: some basic knowledge of MOSFETs and CMOS technology
Level of difficulty: medium
Mathematics: simple

Remark: This course is particularly useful to those students who take E412 (Wafer Fabrication and Device Measurement), E446 (VLSI Technology).

CONTENT

Thin film deposition. Chemical and mechanical polishing. Lithography and resist technology. Etching process and technology. Cleaning technology. Process integration. Metrology and analytical techniques

ASSESSMENT SCHEME

Continuous Assessment 20%
Final Examination 80%

TEXTBOOKS

1. Chang C.Y. and Sze S.M., ULSI Technology, McGraw Hill 1996.
2. Taur Y. and Ning T. H., Fundamentals of Modern VLSI Devices, Cambridge University Press 1998.

REFERENCES

1. R.A. Chapman, "CMOS Transistor Gate and Gate Insulator Technology for the 21st Century". SEMI98, pp. 1-33.
2. P. Singer, "Copper Goes Mainstream: Low-k to Follow", Semiconductor International, Vol. 20, No.13 (Nov. 97), pp.67-70.
3. A.E. Braun, "Copper Electroplating Enters Mainstream Processing", Semiconductor International, Vol. 22, No.4 (Apr. 99), pp.58-66.
4. Ruth DeJule, "Lithography : 0.18 μm and Beyond", Semiconductor International, Vol. 21, No.2 (Feb. 98), pp.54-60.
5. Ruth DeJule, "Revolutionizing Process Integration", Semiconductor International, Vol. 22, No.1 (Jan. 99), pp.62-66.
6. T. Ohmi, "ULSI Reliability Through Ultraclean Processing", Proc. IEEE. Vol 81, No.5 (May 1993), pp.716-729.
7. M.M. Heyns et. al., "Cost-Effective Cleaning for Advanced Si Processing", IEDM Tech. Dig. (1998), pp.325-328.
8. Y. Mitsui et. al., "Physical and Chemical Analytical Instruments for Failure Analysis in Gigabit Devices", IEDM Tech. Dig. (1998), pp. 329-332.