ICGEE Curriculum available for 2011/2012 Academic Year

Microelectronics Technology

Module Title:	Microelectronics Technology
Module Status:	Available, running in the 2011/2012 academic year, starting from middle October to middle December

Generic Module Information:

Name of module owner/lecturer?	Dr. Tatiana Perova
Delivery mode: e.g. on-site, on-line, mixed-mode. For on-site specify contact hours per week	**For Dublin located students:** On-site 1.5 hours lectures per week, 1 hour average laboratory per week **For students from other locations:** 3 days intensive block delivery workshop combined with lectures and laboratory work, on-site in TCD
Duration of the module:	1 Semester
Assessment methods and weightings where relevant:	End of semester exam (85%) plus laboratory continuous assessment (15%)
Pass standard:	Demonstration of good activities during the experimental work and mark for the report minimum 40%.
Penalties for late submission of continuous assessment work:	Penalties for late submission of continuous assessment work: reduction of the overall mark
Number of ECTs or institutional credits assigned to the module:	5 ECTs
Course Content or Syllabus (Optional):	• Processing techniques: The following techniques will be examined in some detail: crystal growth; diffusion; ion-implantation; oxidation; lithography; metallisation; plasma etching. • Spectroscopy: Brief introductory material on application of Fourier Transform Infrared (FTIR) and Raman spectroscopy to IC technology will be presented. • Devices/Circuits: Techniques for fabrication of the following devices, using the processing techniques described above, will be studied: • Bipolar: discrete transistor; monolithic IC transistor; resistor; diode; capacitor; circuit layout for ECL NOR gate. MOS: PMOS, NMOS and CMOS technologies will be introduced and the problem of latch-up will be discussed. • Silicon-on-Insulator will be proposed as an alternative to bulk silicon.
Learning Outcomes	On successful completion of this module the learner will be able to: • The course provides the students with an opportunity to fabricate a simple PMOS integrated circuit in Microelectronic Technology Laboratory. • The device contains transistors, a resistor, a capacitor and two logic devices. • During the laboratory course the participants will acquire and appreciation of the various stages in the fabrication of

	the device. • This will include wafer cleaning, field oxidation, the photolithography process, window etching, diffusion, gate oxidation and metallization. • The participants are also fully trained in the safe handling of chemicals. The final part of the course consists of a lecture on device testing and packaging in the lab.
Recommended Text	• S.M. Sze, Semiconductor Devices; Physics and Technology, John Willey & Sons, Inc., USA, 2002 (or any later edition) • J.D. Plummer, M.D. Deal, and P. B. Griffin, Silicon VLSI Technology, Prentice Hall, NY, 2000 (or any later edition). • B.G. Streetman, S. K. Banerjee, Solid State Electronic Devices, Pearson, Prentice Hall, New Jersey, 2000 (or any later edition).
Supplementary Texts	Handouts and Power Point Presentation will be provided at the site.