

Assessment and subject description

Obuda University Kandó Kálmán Faculty of Electrical Engineering		Institute of Microelectronics and Technology		
Subject name and code: <i>Electronic Technology</i> KEXET1ABNE				Credits: 4
Full-time, Spring Semester				
Course: Electrical Engineering				
Responsible:	Csikósné Dr Pap Andrea	Teaching staff:	Gröller György	
Prerequisites:	KEXVR1ABNE			
Contact hours per week:	Lecture: 2	Class discussion: 0	Lab hours: 2	Tutorial: 0
Assessment and evaluation:	exam			
Subject description				
<p><i>Aims:</i> Review materials and processes used in electronic industry. Constructions of microelectronic parts and devices and their manufacturing methods. Basic technologies of electronic interconnections. Microelectronics is one of the main field of hitech. To understand the advanced products is necessary to know their technological background. Develop laboratorial skills in the field of PCB technology.</p>				
<i>Topics to be covered:</i>				
Topics			Week	Lessons
Introduction to the technology and electronic industry Discrete parts, substrates, integrated circuits, modules and devices			1	2
Manufacturing of Printed Wiring Boards: patterning; steps of lithography, screen printing, etching, electroless and galvanic plating.			2	2
Single and double side PCB; main steps of production. Multilayer PCB-s, coo-laminated and sequential methods.			3	2
High Density Interconnections (HDI); new requirements, new processes. Control methods. Design for Manufacturing (DfM).			4	2
Manufacturing of the electronic modules; Surface Mounted Technology (SMT)			5	2
Soldering basics. Solder paste printing, shooting of devices, reflow soldering.			6	2
SMT II: wave soldering, inspection methods, rework. ESD protection.			7	2
test			8	2
Hybrid Integrated Circuits (HIC)			9	2
<i>Thin Film HIC:</i> vacuum deposition methods			10	2
<i>Thick Film HIC:</i> screen printing methods			11	2
Thin and thick passive circuits, trimming methods			12	2
<i>Multichip Modules:</i> types, manufacturing methods				
holiday			10	2
Introduction to the semiconductor technology: Materials (silicon and compounds semiconductors)			11	2
Main processes of IC technology: lithography, doping, oxidizing, etching, epitaxy and vacuum deposition methods			12	2
Micro Electro-Mechanical Systems (MEMS)			12	2
Student presentations				

Printed electronics: materials and technology Student presentations	13	2
Laboratory		
Introduction, working and safety rules	1	3
Manufacturing: Double side, through hole plated PCB. drilling, making hole conductive	2	3
Photolithography, galvanic plating	3	3
Solder mask preparation and patterning	4	3
Assembly processes, soldering TH and SM devices	5	3
Design: Circuit diagram I, borders, finding parts, choosing encapsulation. Block processes,	6	3
Circuit diagram II Drawing a schematic: finding parts, choosing package footprint, wiring, block operations. Board module, practise	7	3
Routing, placing components. Auto routing, manual routing	8	3
Design Rule Check (DRC), practising. Demo	9	3
Assessment and evaluation		
<i>Requirements of the signature:</i>	Participation in the lectures and lab practices is compulsory Perform laboratory tasks and lab reports The test result about the theory is better than 40% Lab test result is better than 40%	
The final mark contributors:	Laboratory works:	33%
	Exam test:	66%
<i>Type of exam:</i>	Written exam	
<i>Evaluation of the exam test:</i>	0 – 49 %	1
	50 – 59 %	2
	60 – 69 %	3
	70 – 84 %	4
	85 – 100%	5
Suggested material		
Gröller György: Electronic technology (presentations and handouts) in Moodle or http://www.uni-obuda.hu/users/grollerg/Electronic-technology/		
<i>Recommended:</i> Happy Holden: The HDI Handbook http://www.hdihandbook.com/download.php		
Comment:		