Assessment and subject description

Óbuda University Kandó Kálmán Faculty of Electrical Engineering			Department of Microelectronics and Technology	
Subject name and code**:** *Electronic Technology KEXET5ABNE* **Credits: 4** **Full-time, Spring Semester**				
Course: Electrical Engineering				
Responsible:	**Csikósné Dr Pap Andrea**	Teaching staff:	**Gröller György, Nádas József, Dr. Ürmös Antal, Meszlényi György**	
Prerequisites:	KMEVR12AND			
Contact hours per week:	Lecture: 2	Class discussion: 0	Lab hours: 2	Tutorial: 0
Assessment and evaluation:	exam			

Subject description

Aims: 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.
Laboratory aims: To develop laboratorial skills in the field of PCB technology.

Topics to be covered:

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). ***Encapsulation;*** types and footprint of the electronic parts	4	2
Manufacturing of the electronic modules; Surface Mounted Technology (SMT) Soldering basics. Solder paste printing, shooting of devices, reflow soldering.	5	2
SMT II: wave soldering, inspection methods, rework. ESD protection.	6	2
test	7	2
Hybrid Integrated Circuits (HIC) *Thin Film HIC:* vacuum deposition methods.	8	
Thick Film HIC: screen printing methods Thin and thick passive circuits, trimming methods	9	2
Thick Film HIC: screen printing methods Thin and thick passive circuits, trimming methods *Multichip Modules:* types, manufacturing methods	10	2
Introduction to the semiconductor technology: Materials (silicon and compounds semiconductors) Main processes of IC technology: lithography, doping, oxidizing, etching, epitaxy and vacuum deposition methods	10	2

Main processes of IC technology: lithography, doping, oxidizing, etching, epitaxy and vacuum deposition methods	11	2
Micro Electro-Mechanical Systems (MEMS)	12	2
Printed electronics: materials and technology	13	2
Consultation	14	2
Laboratory Topics		
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

Requirements of the signature: The test result better than 40%

Type of exam: Written exam

Evaluation of the exam:

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

Recommended: Happy Holden: The HDI Handbook http://www.hdihandbook.com/download.php

Comment: