

Assessment and subject description

Óbuda University			Institute of Microelectronics and Technology		
Kandó Kálmán Faculty of Electrical Engineering					
Subject name and code: Micro- and nanotechnology KEXNTBAMNE					
Credits: 5					
Full-time, Spring Semester					
Course: Mechatronic Engineering, MSc					
Responsible:	Balázs Kovács, Ph.D.		Teaching staff:	Balázs Kovács, Ph.D.	
Prerequisites:					
Contact hours per week:	Lecture: 2	Class discussion:		Lab hours: 2	Tutorial:
Assessment and evaluation:	Exam				
Subject description					
Aims: To offer a knowledge concerning the processes of micro- and nanoelectronic and related electromechanical devices, theirs’s physical background, manufacturing technologies and fields of applications.					
Topics to be covered:					
Topics				Week	Lessons
Introduction, Basics of crystallography				1.	2
Basics of device physics				2.	2
Bipolar and unipolar devices				3.	2
Photoelectric devices.				4.	2
Nanosize devices				5.	2
Test				6.	2
Crystal growth. Layer deposition. Doping and oxidation				7.	2
Layer’s removal, pattern formation, lithography				8.	2
Nanomaterial and nanostructure production				9.	2
University Break				10.	
IC technology sequences				11.	2
Test				12.	2
MEMS, NEMS technology sequences and devices				13.	2
CNT and graphene devices				14.	2
Laboratory					
Measurements of pn junction				2-3	4
Photoelectric phenomenon				4-5	4
Photodetectors				6-7	4
Thermal sensors				8-9	4
Official break				10	-
Hall measurement				11-12	4
MEMS pressure sensors				13-14	4

Assessment and evaluation

Requirements of the signature:

To attend the lectures and laboratories is obligatory. Above that it is required to pass two tests and to perform all laboratory tasks.

Type of exam:

Written and oral

Evaluation of the exam:

To pass the exam to reach at least 50% is required.

Suggested material

Semiconductor Devices: Physics and Technology

Simon M. Sze, Ming-Kwei Lee; 592 pages; John Wiley & Sons; 3rd edition (May 15, 2012); ISBN-10: 0470537949; ISBN-13: 978-0470537947

Introduction to Nanotechnology

Charles P. Poole Jr., Frank J. Owens; 391 pages; John Wiley & Sons; 1st edition (May 30, 2003); ISBN-10: 0471079359; ISBN-13: 978-0471079354

Fundamentals of Microfabrication and Nanotechnology,

Third Edition, Three-Volume Set Marc J. Madou; 1992 pages; CRC Press; 3rd edition (August 1, 2011); ISBN-10: 0849331803; ISBN-13: 978-0849331800

Physics of Semiconductor Devices

Simon M. Sze, Kwok K. Ng; 832 pages; John Wiley & Sons; 3rd edition (October 27, 2006); ISBN-10: 0471143235; ISBN-13: 978-0471143239

Handbook of Semiconductor Manufacturing Technology,

Second Edition Yoshio Nishi, Robert Doering; 1720 pages; CRC Press; 2nd edition (July 9, 2007); ISBN-10: 1574446754; ISBN-13: 978-1574446753

Semiconductor Manufacturing Technology

Michael Quirk, Julian Serda; 666 pages; Prentice Hall; 1st edition (November 19, 2000); ISBN-10: 0130815209; ISBN-13: 978-0130815200

Comment:

The lecture's materials are the basics of the learning process. They could be found on the concerned web sites of the university.