

## Assessment and subject description

<b>Óbuda University</b> Kandó Kálmán Faculty of Electrical Engineering		Institute of Microelectronics and Technology		
Subject name and code: Micro- and nanotechnology II KMENT25TEC				<b>Credits: 6</b>
<b>Full-time, Autumn Semester</b>				
Course: Mechatronics Engineering				
Responsible:	Balázs Kovács, PhD.	Teaching staff:	<b>Balázs Kovács, PhD</b>	
Prerequisites:				
Contact hours per week:	Lecture: 2	Class discussion: 2	Lab hours:	Tutorial:
Assessment and evaluation:	<b>Exam</b>			
<b>Subject description</b>				
<i>Aims:</i> Introduction to and basic knowledge of nano-science and nano-technology. Relations among preparation methods, structure, properties and application of nano-materials.				
<i>Topics to be covered:</i>				
<b>Topics</b>			<b>Week</b>	<b>Lessons</b>
Introduction to nano-science and nano-technology. New character of materials due to the scaling. Application of nano-materials.			1	2
The tools of nanotechnology I.: Classic (optical and electron) microscopy, electron optics, transmission and scanning electron microscope.			2	2
The tools of nanotechnology II.: Scanning probe microscopy. Scanning Tunneling Microscope and Atomic Force Microscope. Manipulation in atomic size region.			3	2
The tools of nanotechnology III.: Electron and Ion Beam Technologies			4	2
The materials of nanotechnology I.: Carbon nanotubes, structures, parameters, production and application			5	2
The materials of nanotechnology II.: Fullerenes and graphene structures			6	2
<b>National Holiday</b>			7	
The materials of nanotechnology III.: Semiconductor nanostructures			8	2
The nano-electronics I.: Quantum effects, effect of scaling and quantization			9	2
The nano-electronics II.: Carbon nano-electronics.			10	2
<b>University Break</b>			11	
Micro- and nano-electromechanical systems I.: Sensors and actuators			12	2
Micro- and nano-electromechanical systems II.: Carbon nanotube sensors			13	2
Micro- and nano-electromechanical systems III.: Optical systems, Lab-on-Chip			14	2

During the class discussions examples/calculations will be done concerning the course topics	every week	2
<p style="text-align: center;"><b>Assessment and evaluation</b></p> <p>Requirements of the signature: To attend the lectures is obligatory. Above that, it is required to pass two tests - to be performed at a separate occasions in the 5th and 10th week -.</p> <p>Type of exam: Written and verbal</p>		
<p style="text-align: center;"><b>Suggested material</b></p> <p><b>Textbook of Nanoscience and Nanotechnology,</b> <i>B. S. Murty et al.</i>, Universities Press (India) Private Limited 2013 DOI 10.1007/978-3-642-28030-6_1, e-ISBN 978-3-642-28030-6</p> <p><b>Fundamentals of Microfabrication and Nanotechnology,</b> Three-Volume Set Marc J. Madou; 1992 pages; CRC Press; 3 edition (August 1, 2011); ISBN-10: 0849331803; ISBN-13: 978-0849331800</p>		
<p>Comment: The lecture's materials are the basics of the learning process. They could be found on the concerned web sites of the university.</p>		