

GAZI UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE ECTS FORM								
Course Code and Title	ILT544 MICRO AND NANO PATTERNING TECHNIQUES							
Credits	3							
ECTS	7.5							
Name of Lecturer And e-mail address	Professor Elif ORHAN eliforhan@gazi.edu.tr							
Department/Program	Advanced Technologies							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall/Spring							
Prerequisites	None							
Course Objectives	The fabrication techniques are one of the important aspects in the nano-science and nanotechnology. The aim of this course is to introduce the fabrication alternatives in micro and nano scales. Particularly, product-oriented fabrication technologies in nanotechnology will be presented with some examples.							
Course Contents	Introduction to Nanosystems and Nanodevices: Fabrication from micro- to nanotechnology. Photolithography. Photomask technology. Soft lithography, nanoimprint method. Interference lithography. Immersion lithography. E-beam lithography. Nano-templates by FIB (Focus Ion Beam). X-ray lithography, Plasmon lithography. Nano-fabrication by self-assembly. Direct writing lithography. Dip-pen nanolithography. A unique example on nano-fabrication: Nano-fabrication processes for integrated circuit technology.							
Course Learning Outcomes	Ability to use technical /modern materials to be required in her/his works, ability to present oral and written forms in her/his field, ability to work on interdisciplinary studies, ability to rapidly distinguish the true an required knowledge and ability to do analyze of results.							
References (References must be up to date)	Books	<ol style="list-style-type: none"> 1. Cui, Z., Nanofabrication: Principles, Capabilities and Limits, Springer, ISBN: 978-0-387-75576-2, 2008. 2. Bhusban, B., Springer Handbook of Nanotechnology, Springer, ISBN: 978-3-540-29855-7, 2007. 3. Jackson, M.J., Microfabrication and Nanomanufacturing, CRC Press, ISBN: 0-8247-2431-3, 2006. 4. Gogotsi, Y., Nanotubes and Nanofibers, Taylor & Francis, ISBN 0-8493-9387-6, 2006. 5. Franssila, S., Introduction to Microfabrication, John Wiley & Sons Ltd, ISBN: 0470851058, 2004. 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42			76	30		188	7.5
Assessment Methods and Criteria		Quantity (mark with "X")				Percentage (%)		
Midterm Exam		X				30		
Quiz								
Assignment		X				10		
Projects		X				20		
Laboratory								
Practice								
Other								

Final Exam	X	40
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	Introduction to Nanosystems and Nanodevices: Fabrication from micro-to nanotechnology	
2. Week	Introduction to Nanosystems and Nanodevices: Fabrication from micro-to nanotechnology	
3. Week	Photolithography	
4. Week	Photomask technology	
5. Week	Soft lithography, nanoimprint method	
6. Week	Interference lithography	
7. Week	Midterm Exam	
8. Week	Immersion lithography	
9. Week	E-beam lithography	
10. Week	Nano-templates by FIB (Focus Ion Beam)	
11. Week	X-ray lithography, Plasmon lithography	
12. Week	Nano-fabrication by self-assembly	
13. Week	Direct writing lithography	
14. Week	Dip-pen nanolithography	
15. Week	A unique example on nano-fabrication: Nano-fabrication processes for integrated circuit technology	
16. Week	A unique example on nano-fabrication: Nano-fabrication processes for integrated circuit technology	