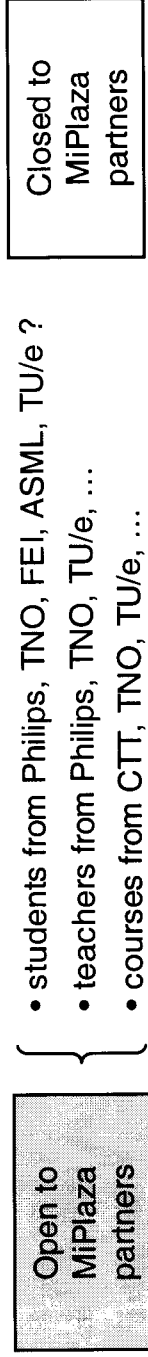


## microsystems and nanotechnology – scope & history

- a range of topics covering the width and breadth of this field
- suited to academic background and HBO/HTS background with sound basic knowledge
- aims to spread knowledge among attendees, which is not readily available otherwise
- possibility to include exams
- aim to have ~10 sessions, ~ 3 hours each to lower travel burden, yet allow self-study
- discusses applications & devices, not just science & capability
  
- evolves from CTT VASTO course
- VASTO excellent track record within Philips, educating generations of HBO/HTS employees
- enthusiastic and capable Philips teachers
- course facilitated by CTT
  
- need to broaden the scope and public to modernize course format
- dwindling enrolment makes it increasingly harder to maintain quality
- increased sense of training needs with faster turnover rates of projects and topics
  
- MiPLaza and open innovation offer best format to achieve this

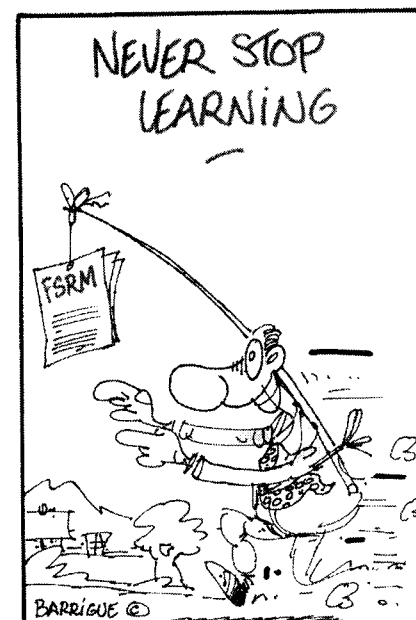
# microsystems and nanotechnology – a possible lay-out



TNO & TU/e curriculum	Magnetic devices , , ,	Coating technology , , ,	Portable energy , , ,	(...)	(...)
CTT curriculum	Display techniques , ,	Applied optics , , ,	Polymer electronics , , ,	Micro-mechanical systems , , ,	ENE + possibly other courses in CTT curr.
B.Sc./M.Sc. level	Introduction to electronics , ,	System in package , ,	Statistics , , ,	Design of experiments , , ,	Molecular diagnostics , ,
base knowledge HBO/HTS	Surfaces, adhesion and self-assembly , , ,	Semiconductor devices , ,	Thin-film deposition & structuring , ,	Chemical & surface analysis , ,	Molecular imaging , ,
	Basic solid state physics	Basic solid state chemistry			compulsory background

## microsystems and nanotechnology – discussion topics for today

- discuss with TNO first – natural partner
- aim to get going winter 2005 – improve from there
- expand to include other parties later
- what internal training is available within TNO
- attractiveness of scheme to TNO (students, teachers, course material)
- other aspects TNO is interested in
- financial side to be discussed later – build course programme first
- Ruud Sanders/CTT experienced with facilitating, financial aspects
- Eric Meulenkamp involved in course programme contents



## Training in Micro- and Nanotechnology

January-June 2005

	course title	date	duration	location
<b>Fabrication</b>				
	Dry Etching :Techniques and Applications	03.02.2005	1 d	Lausanne (CH)
	Glass Microfabrication	10.02.2005	2 d	München (DE)
new	High Density Packaging and ASIC's - Synergies in Miniaturization	25.02.2005	1 d	Zürich (CH)
	RF MEMS	28.02.2005	1 d	Lausanne (CH)
	Micro- and Nano-structures : Characterization and Modification	10.03.2005	1.5d	Barcelona (ES)
	Polymer Based Actuators	15.03.2005	1 d	München (DE)
new	Lithography and Electroplating for Microfabrication	16.03.2005	1.5d	Karlsruhe (DE)
	Polymer Microfabrication	04.04.2005	2 d	Karlsruhe (DE)
	Piezoelectric MEMS for RF and Ultrasonic Applications	07.04.2005	2 d	Lausanne (CH)
	Review of Microfabrication Processes	18.04.2005	2 d	Neuchâtel (CH)
new	Laser Micromachining	25.04.2005	2 d	Bangor (UK)
	Flip Chip & CSP Technology	23.05.2005	2 d	Berlin (DE)
	Porous Silicon in Microsystems	30.05.2005	1 d	München (DE)
	Photon Detection and Counting Techniques	16.06.2005	1 d	Neuchâtel (CH)
	Wafer Bonding	21.06.2005	1 d	Zürich (CH)
<b>Applications</b>				
	Microfluidics: Pipetting, Dispensing and Microarrays	03.03.2005	2 d	Freiburg (DE)
	CMOS Image Sensors	21.04.2005	2 d	Barcelona (ES)
	Microsystems in Biomedical Engineering	28.04.2005	2 d	München (DE)
	Sensors in Household Applications	02.06.2005	2 d	Zürich (CH)
	Micro Optics	16.06.2005	2 d	Lausanne (CH)
	Nanotechnology : Imaging and Engineering at the Nanoscale	23.06.2005	2 d	Stockholm (SE)
<b>Surrounding Techniques</b>				
new	Existing and New MEMS Emerging Markets	08.02.2005	1 d	Neuchâtel (CH)
	Reliability and Test of Microsystems	07.03.2005	2 d	Zürich (CH)
	Start-up Creation in the Field of Microsystems	10.05.2005	1 d	Barcelona (ES)
	Micropositioning	06.06.2005	2 d	Neuchâtel (CH)
	Smart Materials in Robotics and Microtechnology	09.06.2005	2 d	Lausanne (CH)
	Modeling and Simulation of Micro Fluidic Systems	13.06.2005	1.5d	Mainz (DE)

**Information / Registration: [www.fsrn.ch](http://www.fsrn.ch)**

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**Bullema, J.E. (Jan Eite)**

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**From:** eric.meulenkamp@philips.com  
**Sent:** woensdag 2 februari 2005 10:31  
**To:** Bullema, Jan Eite; jan.van.der.linde@philips.com; ruud.g.sanders@philips.com  
**Subject:** Re: Ideeën voor een curriculum

Heren,

hierbij nog mijn ideeën over mogelijke blokken in een cursusprogramma.

Groet, Eric

Uit de CTT-gids:

T&GM 22      Process Control Basics  
 T&GM23      Design of Expts

E&O18          Elektronica voor niet-elektronici  
     55          Polmer electronics  
     78          Display techniques  
     86          Applied Optics  
     94          Sold State Lighting

M&M49          Cooling of Electronics  
     25          Adhesion Science and Technology  
     28          Surface Contamination and Cleaning

VASTO-blokken

Basic solid state chemistry  
 Basic solid state physics  
     Semiconductir devices  
 thin film deposition and structuring (incl. some aspects of vacuum)  
 chemical and surface analysis

Ontbreken dan nog:

Thin film mechanics  
 System in package  
 Sensors  
 Magnetism  
 Coating technology (printing)  
 Assembly and Interconnect  
 Portable power (battery, PV, scavenging)  
 Industrialisation: from the Lab to the factory  
 Microfluidics  
 Molecular Imaging and diagnostics ("Bio")  
 Nanomaterials  
 Basic chemical biology and biochemistry

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Dr. E.A. Meulenkamp  
 Principal Research Scientist  
 Building: WAG 1.2.42 (WAG 11)

Philips Research Laboratories  
 Prof. Holstlaan 4

6-6-2005