EduNano-Industry Need Analysis

The Nano Centers of leading Israeli research universities in conjunction with 3 European universities are developing online courses within the framework of an EU funded TEMPUS project - Education in Nanotechnologies (EduNano).
The courses will target MSc degree Israeli students, industry professionals and high school teachers.
In order to meet the industry employment needs and the needs of academic researchers in the field of Nano technologies and help to provide future students with the most relevant skills and competencies in this field, please fill the following short survey.

1. Name:

2. Company:

3. Please select your current position. Choose one of the following options:

- ○ Engineer
- ○ Technician
- ○ Group leader
- ○ General manager
- ○ University Researcher
- ○ Other

4. The EDUNANO courses will provide the following skills and competences to the learners. For each of the following please rank the skills and competences needed for the industry in the next 2-5 years:

	Courses skills and competences	Very Low	Low	Average	High	Mandatory	Not relevant to my field of expertise
1.	Overview of the fundamentals of Scanning-Probe Microscopy (SPM based nanolitography: STM, AFM, Near-Field optics) and of their place in the present development of nanoscience and nanotechnology	○	○	○	○	○	○
2.	Analyze & understand the results of selected characterization methods: AFM, STM, TEM, SEM, XRD, XPS	○	○	○	○	○	○
3.	Predict the effect of various scanning parameters in Scanning Probe Microscopy	○	○	○	○	○	○
4.	Identify analytical techniques in your work and in the work of others in Scanning Probe Microscopy	○	○	○	○	○	○
5.	Decide which of the various modalities of scanning probe microscopy are appropriate for a specific sample/scientific question	○	○	○	○	○	○
6.	Suggest potential applications of SPM in practical and industrial environments	○	○	○	○	○	○
7.	Propose standard SPM experiments for solving a scientific or technical problem	○	○	○	○	○	○
8.	Perform basic image manipulation and analysis procedures (levelling, filtering, histogram adjustment, statistical and grain analysis) on SPM images	○	○	○	○	○	○
9.	Familiarity with basic surface science concepts	○	○	○	○	○	○
10.	Understand the capabilities and limitations of different computer simulation methods to learn about the properties of materials	○	○	○	○	○	○
11.	Know how to access state-of-the-art simulation codes that are freely available for the study of molecules and solids	○	○	○	○	○	○

	(know how to install them in a computer and know how to run them in parallel computers)						
12.	Study of the properties of materials by doing computer simulations of the interactions between their atoms						
13.	Fundamentals of nano-science, its applications and new developments, including new optoelectronic devices, new materials and new biomedical applications						
14.	Fundamentals of solid-state diffusion						
15.	Highly specialised knowledge on CMOS integrated circuit layout, basic technology, IC design and modeling and specific physical effects in short channel transistors						
16.	Advanced knowledge of a field of materials for nanoelectronics and their use in nanodevices fabrication						
17.	Understand the advantages and disadvantages of different engineered quantum nano-systems						
18.	Calculate basic properties of different quantized nano-systems and estimate sensitivity to noise and measurement						
19.	Know and understand the operation principles, advantages and limitations of important experimental techniques in the fields of nano-science						
20.	Basics of quantum mechanics useful for the design and use of nano devices in particular nano sensors						
21.	Knowledge of the possible device production techniques of nanosystems, in particular of nanogap realization						
22.	Design of CMOS circuits for the management of ReadOut interfaces						

23.	The use of CMOS technology and post-processing processes for the implementation of integrated sensors						
24.	Global overview of bioelectronic sciences and technologies						
25.	Study of bioelectrical interfaces with the dual goal of monitoring physiological phenomena or biological species and of interacting with biological functions						
26.	Fundamental Electrochemistry						
27.	Materials Selection for Electrochemical Energy Storage						
28.	Storage Mechanisms, Materials Design, Operation Mode and Performance Evaluation of Energy Storage Devices						
29.	Fundamentals of nano-science in general and nano-medicine particularly						
30.	Understand the Principles and motivation for target drug delivery						
31.	Familiarity with the tools that are used for Nano-medicine studies						

5. The EDUNANO courses will provide the following skills and competences to the learners. For each of the following, please rank the "Training and Hands on skills" needed for the industry in the next 2-5 years:

	Training and Hands on	Very Low	Low	Average	High	Mandatory	Not relevant to my field of expertise
1.	Photolithography with positive tone and image reversal resists	○	○	○	○	○	○
2.	E-Beam evaporation	○	○	○	○	○	○
3.	Deposition of PECVD silicon dioxide	○	○	○	○	○	○
4.	Reactive ion etching (RIE) of silicon dioxide	○	○	○	○	○	○
5.	Deep reactive ion etching (DRIE) of silicon	○	○	○	○	○	○
6.	Chip singulation – wafer cleaving	○	○	○	○	○	○
7.	Hydrofluoric acid (HF) etching of silicon dioxide	○	○	○	○	○	○
8.	Critical point drying (CPD)	○	○	○	○	○	○
9.	Profilometry (step height characterization for photoresist, silicon dioxide, metal, etc.)	○	○	○	○	○	○
10.	Ellipsometry (thickness measurement of PECVD silicon dioxide)	○	○	○	○	○	○
12.	Confocal microscopy (depth measurement of silicon after DRIE)	○	○	○	○	○	○
12.	Wafer cleaning and photoresist stripping	○	○	○	○	○	○
13.	Atomistic computer simulation of materials	○	○	○	○	○	○

6. Please specify knowledge fields, that will be needed in the nanotechnology industry in the near future (next five years), which are not covered by the courses skills and competences mentioned above:

Finish