

Education in Nanotechnologies Project

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(2014 – 2017)

EduNano Project

- 11 partner institutions will share infrastructure, technological and human resources to develop
 - certified modules,
 - based on ECTS
 - to be used in the corresponding partners' training programmes in nanotechnologies.

TEMPUS Priority

- HE in Israel does not follow the ECTS system
- Tempus Curricular Reform objective is: 'Modernisation of curricula in academic disciplines identified as priorities by the Partner Countries,
 - using the ECTS,
 - the three cycle system and
 - the recognition of degrees'.

Project Aim

- modernisation of engineering and physics curricula in nanotechnologies and
- test the introduction of ECTS within 6 Israeli universities and
- recognition of credits in the EU universities.

Important Note

- The universities will share their infrastructure, technological and human resources,
- they will recognise the common certified modules but
- each university will keep his autonomy regarding the national diploma delivery.

Background

- The project builds upon the results of three previous Erasmus and Leonardo da Vinci projects in the framework of the EU's LLL programme:
 - NanoTrain,
 - NanoSkills and
 - NanoEI.

Objective 1

- To design syllabi and course content and assessment for regular and continuing education courses in nanotechnologies
 - to meet the user needs and
 - to determine the credits for each course unit,
 - based on ECTS
 - till September 2014.

Objective 2

- To select innovative content for the defined learning outcomes and
- videorecord lectures and practical work in the high-tec laboratories of partner institutions
 - by July 2015.

Objective 3

- To adapt/develop new e-learning courses with modular structure for the innovated curricula of partner universities and
 - to establish a platform and procedures for knowledge sharing inside Israeli academy, industry and students
 - by the end of September 2015.

Objective 4

- To perform a pilot test and to start the implementation of the joint modules/ courses delivery
 - from October 2015 till September 2017
 - as a part of the regular educational practices at each university
 - with at least 200 students and retrained teachers.

The courses

- Bar Ilan University
 - 'Advanced Nano-science: Nanostructures, Nanophotonics, Single-molecule techniques' and
 - 'Advanced Optical Microscopy & Nanoscopy';
- Ben-Gurion University - interactive video workshops:
 - 'Biophysical characterization techniques and selected applications in nano-bio and nano-materials' and
 - 'Laser capture Microdissection and laser optical trapping techniques and selected applications in nano-biotechnology' for graduate students and company employees.

The courses

- Weizmann Institute
 - courses for chemistry high school teachers to disseminate nanotechnology in their chemistry lessons;
 - administer an advanced course in the field of nanotechnology focusing on the SPM technique and its applications in research and in nanotechnology industry.
- Hebrew University of Jerusalem
 - 'Protein engineering and nano biotechnology' and
 - 'Biotechnology in agriculture and environment'.

The courses

- Technion - Israel Institute of Technology
 - 'Physics and chemistry of small system' and
 - training sessions on scientific procedures or equipment related to nanotechnology 'Electron microscopy in chemical engineering';
- Tel Aviv University
 - 'Modern optical and mechanical methods of material nano-characterization';
 - technological course: 'Laboratory in modern optical and mechanical methods of material nano-characterization'.

The courses

- Politecnico di Torino
 - 'Bio-Nanoelectronic devices for biosensing',
 - 'Nano/Microelectronic interfaces for brain studies',
 - 'Molecular electronics for the realization of novel nanoelectronic devices'.
- Technical University of Sofia
 - 'Design of nanoscale ICs' (Cadence, Synopsys)
 - 'Defaults and non-invasive testing of nanodevices'.

The courses

- CIME NanoTech
 - courses with recorded practical work in clean rooms ‘Biotechnologies’ and ‘Nanostructures analysis’.
- Elbit Systems
 - course for training of employees ‘Advanced Materials and Nanotechnologies for Electrochemical Energy Storage’.
- ISN and Elbit
 - represent the enterprises and social partners and they will be involved in all stages of the qualifications definition and training development to insure the work-linked content will satisfy the needs of the



Three kinds of courses

- Full-semester academic courses
 - will allow different universities access to the same class.
 - These courses will have to be approved by each academic program individually, and
 - will cover introductory topics, such as physics of nano systems, basic biology for physics students, basic photonics for non-engineering students, etc.

Three kind of courses

- Full academic courses focusing on technology
 - These courses are similar to courses already existing in most universities, but will be complemented and enhanced by documented demos, which will allow improved learning for students.
 - These courses should be extremely valuable to people from the industry.

Three kinds of courses

- The third type of courses will be of a small scope, covering a particular topic
 - They will be used as introductory courses for graduate student training, or for people from the industry.
 - Those courses will be most valuable in enhancing the training of users in new technologies.

The project rationale

- The planned curricular reform will focus on content, structure, teaching methods and the use of new teaching materials with regard to the European modernisation agenda for higher education.
- Newly developed courses will be structured according to the three cycle system.

The project rationale

- A recognition arrangements between higher education institutions in the EU and in Israel will be established.
- There is research and development in nanotechnologies in pharmacology, medicine, electronics, chemistry, physics.
- So, not all courses will be implemented in each university but only those corresponding to the scientific area of the corresponding curriculum.

Impact

- new opportunities for cooperation between universities and enterprises, high schools and VET institutions sharing of knowledge and educational resources;
- up-to-date courses in the most rapidly developing sciences will prepare better the future specialists for their job;
- satisfied training needs of the staff in SMEs in the sectors of nanotechnologies with accessible on-line and on-the-job training courses.