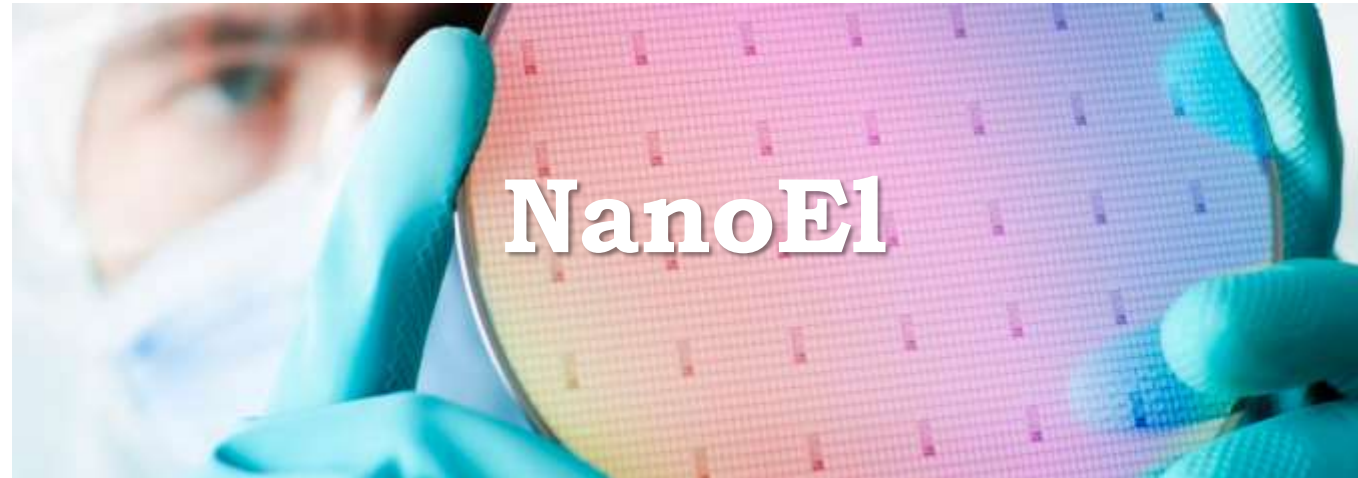
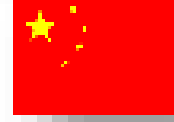


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Internationalised Master Degree Education in
Nanoelectronics in Asian Universities

Partners



אוניברסיטת בר-אילן
Bar-Ilan University



POLITECNICO
DI TORINO



重慶工商大學
CHONGQING TECHNOLOGY AND BUSINESS UNIVERSITY



中国科学院大学
University of Chinese Academy of Sciences



University College
of Southeast Norway



UNIVERSITY
OF MALAYA



Objectives

- To analyse the educational needs in nanoelectronics and nano-bioelectronics and to define the learning outcomes – 30 March 2017. **Achieved**
- To design syllabi and course content and assessment for courses in nanoelectronics - 30 September 2017. **Achieved**
- To develop e-learning courses and to establish a platform for knowledge sharing inside Asian, Israeli and European academy and students – 30 July 2018. **Delayed**
- To perform a pilot test and to start the implementation of the joint courses delivery during the last project year – 15 October 2019. **Started**

Activities and results. Need analysis

- Survey for need analysis of the Partner countries labour market – 115 respondents from the industry
- Survey for need analysis of the Partner countries HEI teachers – respondents are 90 teachers and HEI managers
- Survey for need analysis of the Partner countries students – respondents are 286 BSc and MSc students
- **Need analysis report**

Activities and results. Need analysis report

- Industry
 - mean interest in the multitude of subjects that the partner universities aims to offer as open educational resources.
- University teachers
 - the majority are familiar with open education resources and appreciate the benefits of using them in the teaching
 - an interest and a desire in offering the students a more diversity of topics within micro- and nanotechnology
- Students
 - the majority are in an educational programme that uses open education resources and prefer to use a multitude of open education resources
 - consider that open educational resources lead to improved learning and makes the learning content more attractive.

Activities and results. Learning outcomes

- Development of guidelines for learning outcomes definition according to the requirements of EU
- Definition of learning outcomes of 27 courses to be developed according to the need analysis.
- **Competence matrix**

Activities and results. Syllabi of 27 courses developed and course content designed

1. Microelectronics for ICT (TUS)
2. Design of Nanoscale MOS ICs (TUS)
3. Nanomaterials (TUS)
4. Nano Materials and Nanotechnology (UM)
5. Materials Characterisation (UM)
6. Carbon nanotube and applications (UTAR)
7. Graphene Nanoelectronics: From synthesis to device applications (UTAR)
8. Top-Down ASIC Design Flow (CTBU)
9. Bio-sensing microsystems (CTBU)

Syllabi of 27 courses developed and course content designed

10. Advanced electronic devices (TAU)
11. Introduction to VLSI circuits (TAU)
12. Fabrication methodology for micro and nanosystems (TAU)
13. Bio-Nano Electronics and BioMolecular Computing (Polito)
14. Memristor Technology for Cognitive Computing (Polito)
15. Sensing at the Nanoscale (BIU)
16. Nanoelectronic Device (BIU)
17. MEMS Design (HSN)
18. Sensor Interface (HSN)

Syllabi of 27 courses developed and course content designed

19. Raw materials for Nanobio-structures (MU)
20. Socio-ethical and environmental aspects (MU)
21. Nanotechnology for Solar Energy Utilization (NCNST)
22. Nanoelectronic Materials (NCNST)
23. Functional Nanostructures: Synthesis, Characterizations and Device Applications (NCNST)
24. Introduction to Nanoelectronics: Science & Technology Basics (NIIT)
25. Nanoelectronics: Processes, Computation and Design (NIIT)
26. Nanoelectronics Systems: Future Nanoelectronic Devices and Manufacturing processes (NIIT)
27. Nanoelectronics Systems: Applications- Quality living with Smart Future, Present to Future Business Systems (NIIT)

Activities and results. eLearning platform

- E-Learning platform based on Moodle created by Tel Aviv university: <http://nanoel-lms.tau.ac.il/moodle>
- Training seminars on e-learning materials development – meeting in Tel Aviv
- Practical training on videorecording lectures and laboratory practice and publishing videos in Moodle environment – meeting in Norway

Activities and results.

eLearning courses. Problems with equipment

- Impossible to obtain formal letters from tax authorities in India and China for GST exemption
- Institutional rules allow to spent only the part of the budget for equipment corresponding to the advance, i.e only 50% could be purchased
- Impossible to have one provider for different kinds of equipment, i.e. servers, videocameras, software, books – more than one tendering procedures.
- Non-transfer of second advance by EACEA.

Delayed implementation of project objective 3.

Activities and results. eLearning courses

- Some partners developed the e-learning courses
(mostly the EU partners which do not depend on the equipment purchase)
- 1. Microelectronics for ICT (TUS)
- 2. Design of Nanoscale MOS ICs (TUS)
- 3. Nanomaterials (TUS)
- 10. Advanced electronic devices (TAU)
- 11. Introduction to VLSI circuits (TAU)
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Activities and results. Evaluation

- Quality assurance plan
- Peer review of syllabi, courses, e-learning environment
- Questionnaire for the usability tests for the pilot
- External evaluation report for the first stage of the project

Activities and results. Management

- 5 project steering committees meetings
- 4 Cluster meetings attended in Brussels, China, Malaysia and India
- Partnership agreements signed, advances transferred
- VAT exemption problem solved for Israel and Malaysia
- A lot of efforts to solve it in China and India
- Intermediate report submitted in April 2017
- Amendmendment for project extension needed because of delayed purchase of equipment and reception of second advance.

Achievements

- All tasks implemented and results achieved for the first half of the project
- 27 instead of 22 courses under development.
- Perfect collaboration between partners with different culture, religion.
- Successful internationalisation of HE in India, Malaysia, Israel and China.
- New curricula under accreditation – non planned achievement.

Problems encountered

- Problem at Mumbai University
- VAT/GST exemption – to be solved with national laws and legal regulations translated instead of a formal letter from tax authorities
- Equipment purchased when the grant is available
- Activities are delayed or stopped until the approval of the interim report and receipt of the second advance.
- If the project continues an amendment for extension with 6 months to one year will be required.

Activities and results. Pilot test

- Questionnaire for the pilot test designed and evaluated by peer review
- Pilot test of the already developed courses started
- The other activities are delayed or stopped until the approval of the interim report and receipt of the second advance.

Without equipment it is impossible to continue



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