Best European Practices in Teaching Engineering Disciplines and Teacher Competence Enhancement

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Oracle Academy

- Research and development
- Curriculum development and delivery
- Governance
- Lifelong learning
- Internationalization and mobility
- Higher education
- Industry

I. Quick Facts

EU country: global

WEB page: https://academy.oracle.com/

Competence enhancement: University teachers are provided with a complete portfolio of computer science education resources.

Relation to engineering: Computer science

Oracle Academy

II Summary

Mission:
- To provide resources to help prepare teachers and students for life and work in our modern technology-driven global economy.

Description:
- Each year, Oracle Academy reaches more than 3.5 million students in 120 countries.
- Oracle Academy offers a complete portfolio of computer science education resources to secondary schools; technical, vocational, and two-year colleges; and 4-year colleges and universities, with the goal of helping students become college and career ready.
- Oracle Academy supports continuous computer science learning at all levels, making available a variety of resources that can be used in the classroom and in not-for-profit academic course- and degree-related research, including technology, curriculum and courseware, student workshops, educator training, and Oracle industry certification and exam preparation materials.
- Students develop IT and business skills while using production software used widely across hundreds of industries, and educators keep pace with current technology through ongoing professional development.

III Checklist of Prerequisites to success
- Willingness of institution to make an account on Oracle Academy
- Willingness of teachers to enroll in the Oracle Academy program
- Infrastructure (classrooms and labs), staff (academic)

Summer Schools organised by Faculty of Automatic Control and Computers, UPB

- Research and development
- Curriculum development and delivery
- Governance
- Lifelong learning
- Internationalization and mobility
- Higher education
- Industry

I. Quick Facts

EU country: Romania

WEB page: http://acs.pub.ro/

Competence enhancement: University teachers need to have/increase the ability of conducting projects and workshops with a high practical applicability, correlated with industry needs.

Relation to engineering: Computer science

Summer Schools organised by Faculty of Automatic Control and Computers, UPB

II Summary

Mission:
- To provide advanced educational resources related to specialised fields of computer science, with a high practical focus.

Description:
- Each year, ACS organises several specialized summer schools, which last 2 months e.g. 3DUPB Summer School (http://3d.upb.ro/), LeMAS "Multi-Agent Systems and Learning Agents" Summer School etc
- Industry guest lectures are invited at these summer schools.
- The curriculum is aligned with the mandatory university curriculum and offers extra knowledge.
- The students can equivalate their mandatory practical period with their participation at the summer schools.
- Summer schools are a starting point for the final bachelor projects.
- Summer schools are a good way of attractive students from other universities to master and PhD studies at UPB.

III Checklist of Prerequisites to success
- Directives of faculties' leaders
- Willingness of faculty teachers to organize the summer schools
- Infrastructure (classrooms and labs), staff (academic)

Faculty of Engineering in Foreign Languages, UPB

- Research and development
- Curriculum development and delivery
- Governance
- Lifelong learning
- Internationalization and mobility
- Higher education
- Industry

I. Quick Facts

EU country: Romania

WEB page: http://ing.pub.ro/

Competence enhancement: University teachers need to have/increase the ability of teaching engineering disciplines in foreign languages, correlated with international curricula.

Relation to engineering: Computer Science, Applied Electronics, Mechanical Engineering, Chemical Engineering, Engineering and Management

Faculty of Engineering in Foreign Languages, UPB

II Summary

Mission:

- To provide higher engineering education in 3 foreign languages of international circulation: English, French and German.

Description:

- The formation of bilingual and multilingual specialists with a wide area of expertise, capable of filling the needs of Romanian companies with developed external partnerships, of mixed enterprises and of foreign enterprises established in Romania.
- The promotion of mobility for students by facilitating their travel abroad for internships in foreign companies, perfecting their language skills and offering the possibility of study in foreign partner universities and also creating opportunities for student exchanges.
- The development of bilateral and multilateral ties with the engineering schools of foreign universities, in the purpose of assuring a rapid exchange of pedagogical and specialized knowledge and of creating the conditions for the recognition of diplomas.
- The possibility for foreign students to directly commence their studies without the need of learning the Romanian language beforehand.

III Checklist of Prerequisites to success

- Directives of university leaders'
- Engineering teachers who have foreign languages competences
- Infrastructure (classrooms and labs), staff (academic+administrative)

Entrepreneurship Center, UPB

- Research and development
- Curriculum development and delivery
- Governance
- <u>Lifelong learning</u>
- Internationalization and mobility
- <u>Higher education</u>
- <u>Industry</u>

I. Quick Facts

EU country: Romania

WEB page: http://antreprenoriat.upb.ro/

Competence enhancement: University teachers need to have/increase entrepreneurship skills and how to fasten the transfer of knowledge to industry.

Relation to engineering: all areas of engineering

Faculty of Engineering in Foreign Languages, UPB

II Summary

Mission:
- the support, development and encouragement of the entrepreneurial spirit among the students and graduates, in order to transform UPB into a supporter of the business environment;
- the diversify the university education package by including a series of activities complementary to the university curriculum.

Description:
- Several courses related to starting a business are provided.
- Mentorship and success stories are offered to students.
- Industry specialists and experts are involved in the centre activities.
- Hackathons and startup accelerators are organised.

III Checklist of Prerequisites to success
- Directives of university leaders'
- Engineering teachers with entrepreneurship skills
- Infrastructure (classrooms and labs), staff (academic+administrative)

IT University, Sweden

- <u>Research and development</u>
- Curriculum development and delivery
- Governance
- Lifelong learning
- Internationalization and mobility
- <u>Higher education</u>
- <u>Industry</u>

I.   Quick Facts

EU country: Sweden
WEB page: http://www.ituniv.se/
Competence enhancement: University teachers need to have/increase the ability of conducting research and educational collaborative activities with industries.
Relation to engineering: ITC

IT University, Sweden

II Summary

Mission:

- to manage and develop the areas within ICT in Gothenburg that are not already a part of any of the Areas of Advance, departments or of the ordinary education areas, with questions about how the use of IT can lift each business.

Description:

- IT University is a network common between Chalmers and University of Gothenburg. In order to regulate the activities there is an agreement signed by the President of Chalmers and the Vice Chancellor of University of Gothenburg.
- The IT University is also responsible for linking IT to research, education and other activities where IT is not the area's main component, but an important tool to reach full potential and acheive excellence in research and education.
- IT University will also actively contribute to the development of a virtual campus at Lindholmen in Gothenburg. **Lindholmen Science Park** is an international collaborative environment for research, innovation and education within the areas Transport, ICT and Media. The universities collaborate with high tech industries and the local community in different development projects. Currently 250 companies, notably Volvo Cars, Volvo Technology, Ericsson, IBM. Over 21 000 employees or students are working or studying at the area.

III Checklist of Prerequisites to success

- Directives of university leaders'
- Infrastructure (classrooms and labs), staff (academic+administrative)
- Proximity of companies and universities
- Willingness of collaboration from the private sector

Other Initiatives

• Professionally oriented HEI, such as the **universities of Applied Science**, which provide educational programmes oriented towards immediate needs of labour market and usually involving some form of work-based component.

• The **German and Hungarian models** with "dual" HE studies:
  - The dual system consists in a new, but emerging programme format at tertiary level, which combines an advanced practical apprenticeship with a "school-based" theoretical programme.
  - Example: the combination between mechanical engineering courses and an apprenticeship in the automotive sector.
  - Both the German and Hungarian systems are distinctive in requiring students to follow two programmes (HE and VET) in parallel.
  - The Hungarian model is a joint initiative between government, the HE sector and private business, whereas the Germany model is based on the business leadership. In both cases, key challenges have been to facilitate the participation of SMEs in the system and to ensure proper coordination between the (pre-existing) school and work-based courses.

• Source: EC-DGEC (2015) Promoting employability through higher education, ET 2020 country workshop, Brussels, 2-3 February 2015, European Commission, Directorate-General for Education and Culture available at: http://ec.europa.eu/education/policy/strategic-framework/expert-groups/documents/higher-education-employability_en.pdf

Other Initiatives

• The **Austrian model** of the dual VET system: Austria offers an ideal combination of theoretical background knowledge, practical skills and important key qualifications. The wide success of this training proves that young people are aware of the benefits of apprenticeship.

•Source: FMSRE (2014) Apprenticeship: dual vocational education and training in Austria ; modern training with a future / Federal Ministry of Science, Research and Economy [Ed.]. - 13th, rev. ed., August 2014. - Vienna, 2014

Things to Reflect Upon

- What elements can be inserted in EXTEND excellence centres?
- What resources are necessary to do that?

Thank you!

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