Combining Education and Research in Engineering – the Budapest experience

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Budapest University of Technology and Economics (BME)
On our main features

• Location "quite in the heart of Europe"
• Center of excellence type of education, but mass education is not avoidable, either
• Research University, country leading in engineering science
• International rankings: falling in the uppermost 2–3%
BME in Figures

1782  Institutum Geometricum–Hydrotechnicum

1949 – 2000 Technical University of Budapest
2000 – Budapest University of Technology and Economics

- 8 Faculties
- 78 Departments

<table>
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<th>Faculties:</th>
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<tr>
<td>Civil Engineering (1782)</td>
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<td>Mechanical Engineering (1871)</td>
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<td>Architecture (1873)</td>
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<td>Chemical and Biotechnology (1873)</td>
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<tr>
<td>Electrical Engineering and Informatics (1949)</td>
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<td>Transportation Engineering (1951)</td>
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<td>Natural Sciences (1998)</td>
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<td>Economic and Social Sciences (1998)</td>
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- 24,000 Students (BSc, MSc, PhD)
- 1,500 Academic staff members
International Students at BME

Incoming international students in 2015

- ERASMUS
- ACTIVE
- STIPENDIUM HUNGARICUM
- SCIENCE WITHOUT BORDERS (BRAZILIAN)
Let us turn to the topic proper: Education and Research in Engineering

- University of Technology
  - Education and lab–, field and computer–intensive research have to go in general hand in hand

- In–house research and industry–based R&D
  - Exploratory research
  - Applied research and innovation
Education and Research
In what age to start?

• Our new initiation in 2015: Children University
  – Summer school for 7–10 and 11–14 years old primary school children
  – Week-long education, including lectures, lab and project work in teams, with final presentation
  – In 2015 2x300 children, in 2016 2x400 children
  – Own website, 2017 is already fully booked up
Look at those open minded faces!
The wise owl
Final presentation
Graduation ceremony
Next level: Secondary school age

• Looking for future students talented to research
  – University Talency Council in key role
  – Cooperation with nearly thirty secondary schools
  – Introductory lectures to natural science, lab visits
  – Recruiting people for engineering, talented doing research in engineering science
When at University: the offered framework is the „Scientific Student Circle”

- SSCs with nearly 60 years history in the Hungarian Higher Education – a so-called Hungaricum
- Talency care
- Fitting to the Bologna system
- Do we need SSCs at BSc level? Yes, we do.
- Can we handle BSc and MSc jointly in that? Yes we can.
Scientific Student Circles at MSc level

• Enhanced involvement in ongoing research projects
  – More and more individual research tasks
  – Supervision with more and more freedom

• Scientific Student Conference once a year in a great number of sessions, with nearly thousand students and 600 presentations a day

• The best ones go to national level and publish paper
Special event: bridge design and construction competition
From Scientific Student Circles to PhD studies

- SSCs are the primary pool to recruit PhD students
- Capacity building for academic staff (both teaching and research) and for R&D&I companies
- Research achievements converted to teaching material (both classical and e-learning type)
- That’s how all this works, hoping that one day the kids of our doctoral students come also to our Children University, making all the process cyclic