Towards a Common Frame for European CS/Informatics Education
Personal

Károly Kondorosi PhD
kondor@iit.bme.hu
associate professor

head of software group
Department of Process Control
and Information Technology

scientific director
Innovation and Knowledge Centre
of Information Technology
BME (Budapest University of Technology and Informatics)
BME facts

- Founded in 1782
- 8 faculties (6 engineering)
- ~ 22 000 students
- ~ 1200 staff-members
- ~ 1500 supplementary employees
- ~ 100 M EUR annual budget (~ 60% from the state, 40% others)
Faculty of Electrical Engineering and Informatics (VIK)

- Founded in 1949 as FEE (VK)
- Education in „Technical Informatics” started in 1986
- „Informatics” was added to the name in 1992 FEEI (VIK)
- ~ 5000 students (½ EE, ½ I)
- ~ 350 staff-members
- ~ 300 supplementary employees
- ~ 300 PhD students
- BSC system started in 2005
VIK - Departments

- Automation and Applied Informatics
- Broadband Infocommunications and Electromagnetic Theory
- Computer Sciences and Information Theory
- Control Engineering and Information Technology
- Electron Devices
- Electronics Technology
- Measurement and Information Systems
- Power Engineering
- Telecommunications
- Telematics and Media-Informatics
Innovation and Knowledge Centre of Information Technology (IT)²

- Founded in 2005 as a consortium and an organizational unit of the university
- 9 industrial partners (3 multinational, 6 Hungarian small-medium)
- 4 departments from BME (2 VIK, 2 others)
- Budget: ~1,3 M EUR/Year (~90% state, 10% partners)
- Self-sustainig after 3 years
- Research-programs & cross-cutting development-projects

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17/10/2006  euroTICS 2006  K. Kondorosi: Towards ... - 7
Outline

• Bologna-process
  ♦ Hungarian version
  ♦ What we need to implement it...

• Informatics – what is it?
  ♦ An attempt to define it...

• How to compare degree programs in Informatics?
  ♦ Improved ACM-IEEE-CS CC
Bologna in Hungary (Informatics)

• Origin (informatics)
  ◆ Science Universities – mathematics
  ◆ Technical Universities – electrical engineering

• Before
  ◆ Engineering:
    ▪ 5-year university degree (~MSC)
    ▪ 3-year polytechnic degree (~BSC)
    ▪ Separate institutions, few student-mobility
  ◆ Science (programming):
    ▪ Universities: 3+2
    ▪ Lower level: 3

• After
  ◆ 3.5-year (7-semester) BSC (probably unique in the world)
  ◆ technical informatics, computer programming, business informatics
  ◆ 2-year MSC
Bologna requirements - 1

“easily readable and comparable degrees”

- What about the number of degrees in EU in informatics?
- How to compare them?

We need

- **definition** for the discipline of informatics
  
  I’ll try later

- an **agreement** on a (small) number of degrees
  
  - a list of **topics** for each degree
  
  - a list of **outcomes** for each degree

  ACM CC seems to be a good basis, I’ll propose some improvements later

- *(comparable marking)*
“two main cycles”

• Change from theory first, specialisation with more practice later to a reverse order education – *with almost the same staff.*

• “The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification.”

• *There should be no difference between BSC degrees of universities and that of polytechnics*

“system of credits”

♦ credit is a unit of ???
♦ it is the point where ACM – as for me - gave up
♦ European Credit System is a goal
Bologna requirements - 4

“quality assurance”
Should we use ISO or other process-oriented concepts?
Our proposal: **thinking in the whole quality-frame**

E.g.: Recommendation for the lower bound of necessary resources (staff, infrastructure etc.).
Informatics – what is it?

- Do we have a definition for Informatics?
- We changed the term (buzzword?) in ‘80s from computer... to informatics
- From engineering view: **focus moved from computer to the domain**

**Informatics** is a field of professional knowledge and skills, subjects of which are:

- **the information itself** (nature of it, metrics for it, representations, data-information-knowledge ...)
- **operations on the information** (processing, transferring, extracting, storing, ...)
- **tools and systems for executing operations on the information** (computers, computer systems, hardware, software, ...)
- **operations on such tools and systems** (design, implementation, maintenance, ...)
How to compare degree programs?

ACM - IEEE-CS - AIS CC 2005 is a good baseline

Content of the Overview Report:

- Description of disciplines
- *Graphical and tabular comparison*
- Outcomes
- Programmes, career opportunities, organisational & curricular models, accreditation
- US, GB ...
Graphical comparison

Qualitative, based on the consensus of the working-group
Tabular comparison

- Weighting of 36 computing and 21 non-computing topics in different disciplines

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<th>Knowledge Area</th>
<th>CE Min</th>
<th>CE Max</th>
<th>CS Min</th>
<th>CS Max</th>
<th>IS Min</th>
<th>IS Max</th>
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- Does not represent the relative weight of topics to each other
- The body of knowledge is described in specific volumes
Experimental visualization

- Curriculum-development at BME VIK
- How to compare our degree program (BSC in technical informatics) to others?
- Requirements:
  - Impressive visualization
  - Deliverable from curriculum-tabs
Method of comparison

- **Defining the space of Informatics:**
  - Human
  - Theory of computing (including special mathematics)
  - Mathematics (except for computing-related, like Algorithms, etc.)
  - Physics (including system theory and electronics)
  - Hardware & Architecture (deep in HW and networking)
  - Infrastructure (fundamental HW-SW components and systems)
  - Software (including programming and SE)
  - Information (eg. databases)
  - Management (related to the information system)
  - Organization & Business

- **Classifying the topics** assigned as body of knowledge into the categories above, and doing the same with BME-VIK program
## Tabular representation of the results

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<tr>
<th>Area</th>
<th>CE</th>
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- Units are ~ hours/week projected to one semester
- Non-uniform measures – only for relative weighting within a discipline
- Classifying is based on the consensus of some BME staff-members only
Graphical representation
Proposed improvements

What euroTICS could add to CC 2005 methods

- Elaborate a widely consensual definition of the space of Informatics
- Elaborate metrics for the weight of topics – CREDIT system???
- (Learning outcomes – it was an other presentation)
Thanks for your attention