Engineering Education at the University of Luxembourg
- Hand in hand with national industry

**Agenda**

**Structure of Engineering Education in Luxembourg**

Bachelor, Master, PhD

**Example of involvement of industrial partners in Master education**

Executives as teachers & Program Accompanying Committee

**Cooperation with industry on PhD level**

Research aligned with industry needs
## The University scorecard

<table>
<thead>
<tr>
<th>Category</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year founded</td>
<td>2003</td>
</tr>
<tr>
<td>Faculties + interdiscipl. Ctr.</td>
<td>3 + 3</td>
</tr>
<tr>
<td># of students (WS14/15)</td>
<td>6,287</td>
</tr>
<tr>
<td>Professors (WS14/15)</td>
<td>181</td>
</tr>
<tr>
<td>Bachelor programs</td>
<td>11</td>
</tr>
<tr>
<td>Master Programs (2015)</td>
<td>23</td>
</tr>
<tr>
<td>Total staff (2014)</td>
<td>1,500</td>
</tr>
<tr>
<td>External “vacataires”</td>
<td>794</td>
</tr>
<tr>
<td># Bachelors inscribed (WS 2015)</td>
<td>3,231</td>
</tr>
<tr>
<td># Master inscribed (WS 2015)</td>
<td>1,283</td>
</tr>
<tr>
<td>PhD students (2015)</td>
<td>580</td>
</tr>
<tr>
<td># in-the-job students</td>
<td>1,204</td>
</tr>
<tr>
<td>Budget</td>
<td>175 M€</td>
</tr>
<tr>
<td>Foreign students (2015)</td>
<td>56%</td>
</tr>
<tr>
<td>Mobility of students</td>
<td>100%</td>
</tr>
<tr>
<td>THE ranking (2015)</td>
<td>193</td>
</tr>
</tbody>
</table>
Structure of Engineering Education in Luxembourg

Bachelor académique
3a

Bachelor professionnel
3a

Master professionnel
2a

Master en Sciences de l'Ingénieur
Efficacité énergétique et économique

Professional Life

Ph.D.
3a

Master en Development Durable
- filiere
Energie et environement

Master en Information and Computer Sciences (académique) *

Master of Science in Engineering Sustainable Product Creation

Master of Science in Civil Engineering
Megastructure Engineering with Sustainable Resources

Master académique
2a

Bachelor académique
3a

* Courses offered by FSTC- CSC
Classes related to Production Technologies

Bachelor

- Fertigungstechnik
  - Prof. Dr. P. Plapper

- Werkzeugmaschinen I
  - Prof. Dr. K. Hofmann-von kap Herr

- Werkzeugmaschinen II
  - Prof. Dr. P. Plapper

- Robotik
  - Prof. Dr. W. Gerke

Master

- Production Technologies
  - Prof. Dr. P. Plapper

- Assembly Technologies
  - Dr. H. Thommes, industry

- Assembly Machines
  - Dr. Th. Tentrup, industry

- Operational Excellence Laboratory
  - Prof. Dr. P. Plapper

- Total Preventive Maintenance
  - J. Papin, industry

- Robotic
  - Profs. P. Plapper, Müller, Brüls
Example of teaching NC technology in the Bachelor professionnel

Three step approach

1. Class
   Understanding and comprehension of NC Syntax

2. Simulator
   Programming of different parts using a NC Simulator

3. Practical Exercise
   Milling of „own“ parts on DMG 50
Industrial experience ...

... shows a wall separating product design and manufacturing engineering.
Master of Science in Engineering - Sustainable Product Creation

Started WS 2014

Teaching language: English

- Product Planning and Management
- Product design Calculation
- Product manufacturing
- Product usage Service and recycling

- Complete product creation chain
- Sustainability
- Interdisciplinary (Mechanical, Electrical, Mechatronic)

Pictures: internet

P. Plapper
Master of Science in Engineering - Sustainable Product Creation

Distribution of ECTS taught

- University of Luxembourg: 68%
- Industry: 17%
- Other Universities: 15%

- Get contact to future engineers
- National companies send “future COO/CTO” to teach at the University

P. Plapper
Nomination of
Program Accompanying Committee (PAC)

<table>
<thead>
<tr>
<th>Programme(s)</th>
<th>Master of Science in Engineering – Sustainable Product Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durée du mandat</td>
<td>4 ans à partir de la date de signature</td>
</tr>
</tbody>
</table>

Comité de pilotage (ROI art. 11.5.402)

<table>
<thead>
<tr>
<th>Membres de la Faculté</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plapper, Peter</td>
</tr>
<tr>
<td>Prof. Dr.-Ing.</td>
</tr>
<tr>
<td>Chair, Course director</td>
</tr>
<tr>
<td>Kedziora, Sławomir</td>
</tr>
<tr>
<td>Ass. Prof. Dr.-Ing.</td>
</tr>
<tr>
<td>Co-Chair, deputy course director</td>
</tr>
<tr>
<td>Maas, Stefan</td>
</tr>
<tr>
<td>Prof. Dr.-Ing.</td>
</tr>
<tr>
<td>Full faculty member</td>
</tr>
<tr>
<td>Gericke, Kilian</td>
</tr>
<tr>
<td>Dr.-Ing.</td>
</tr>
<tr>
<td>Teacher in program</td>
</tr>
</tbody>
</table>

Employeurs, experts et consultants

<table>
<thead>
<tr>
<th>Enseignants vacataires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papin, John</td>
</tr>
<tr>
<td>Nexans</td>
</tr>
<tr>
<td>Vacataire, industrielle</td>
</tr>
<tr>
<td>Tatjana König</td>
</tr>
<tr>
<td>mhr Saarbrücken</td>
</tr>
<tr>
<td>Vacataire, académique</td>
</tr>
</tbody>
</table>

Alumni

| Quentin Ghysens                        |
| University of Luxembourg (tbc)         |
| (future) Alumni                        |

<table>
<thead>
<tr>
<th>Etudiants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paula Hernandez</td>
</tr>
<tr>
<td>Etudiant</td>
</tr>
<tr>
<td>student</td>
</tr>
</tbody>
</table>

Luxembourg, le 13 April 2016

Prof. Paul Heuschling
Doyen de la Faculté
Example of teaching Operational Excellence

Exercise to understand „complete assembly plant“
External trainings

Lifelong learning supporting “in-the-job-students”

- In-house training offered at the site of the industrial partners
- Luxinnovation – Automotive Campus Initiative
- Training hub for Luxembourg Automotive Cluster
Manufacturing Engineering Research
Strategic direction of PhD education

Support national industry
to increase manufacturing competitiveness

Laser assembly
Robotic assembly
Operational Excellence
Laser Research

Laser joining of non ferrous metals

- Cu-Al
- Brittle
- Low conductivity
- Corrosion (ageing)

- Electro-mobility
- Heat exchangers
- Solar energy generation
Project partners & supporters of manufacturing research
Mission statement of PhD education / Research

“Support industry to improve manufacturing competitiveness”

- All research / PhD projects are in cooperation with industrial partners
Link from research to manufacturing industry

Industry
Technology user

University
Technology provider

Integrator
Technology translator

Scientific solution

Technical problem

Industrial solution
Summary

■ Engineering education at the University of Luxembourg

■ Bachelor

  Three level approach toward hands-on application

■ Master with industrial leaders as teachers

  Future COO / CTO as teachers
  Program Accompanying Committee

■ PhD with target of industrial application

  Prepare the PhDs for a career in academia and industry.

■ Mission: Support national industry to improve their competitiveness