



## Curriculum for Employability: „from Theory to Industry“

Prof. Dr.-Ing. Michael Chowanetz

Mai 24th 2016

- Intro TH Nuremberg
  - Where, students, faculties
  - Industry in Nuremberg and surroundings
- Professional background
- Curriculum for employability
  - Staffing
  - Lab exercises
  - Internships
  - Project work & project seminar
  - Thesis at industry
  - “Dual Education” (work & study program)
- Results & Conclusion





## Nuremberg Institute of Technology (NIT)

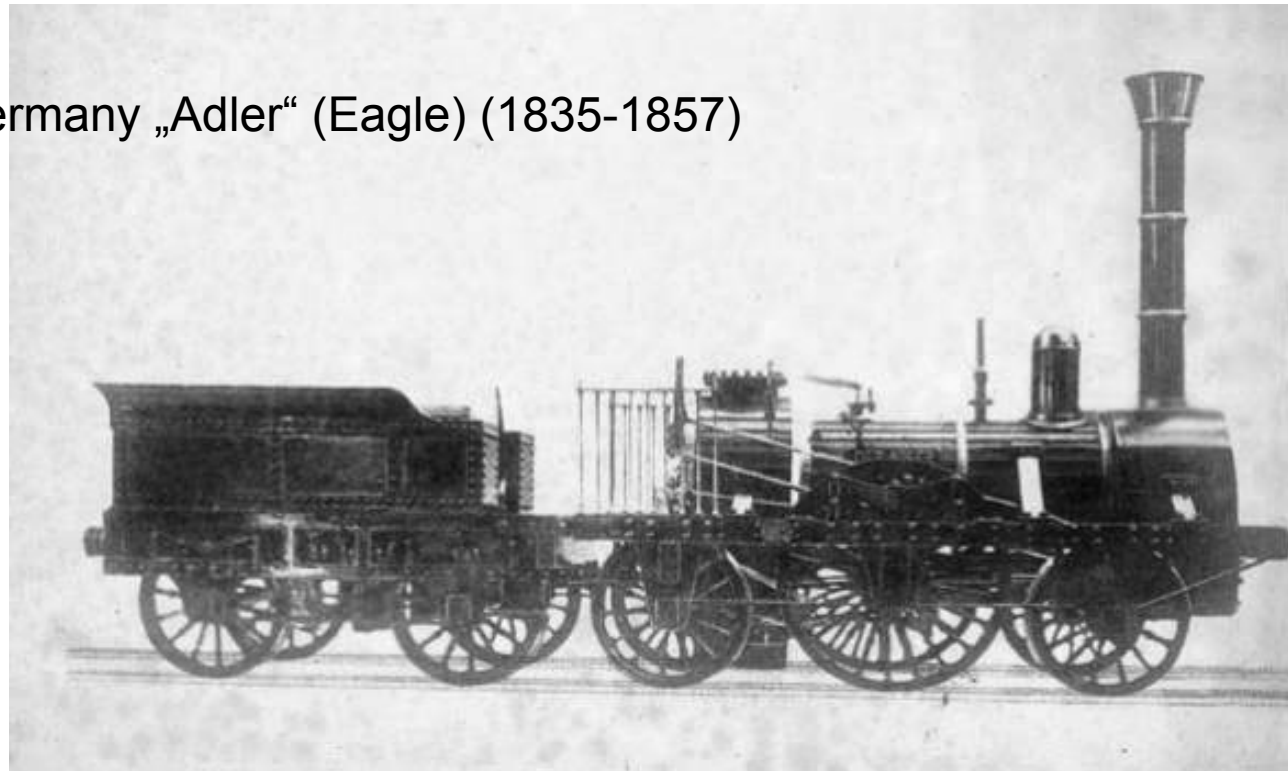
- Ohm's Law (Ohm)
- ...



Headmaster Georg Simon Ohm (1839 – 1849)

## Nuremberg Institute of Technology

- Ohm's Law (Ohm)
- First Railway in Germany „Adler“ (Eagle) (1835-1857)
- ...



Von Unbekannt - Photographie, Salzabzug; [http://web.archive.org/web/20101207002930/http://nuernberg.de/internet/bahnjahr2010/geschichte\\_bildergalerie.html](http://web.archive.org/web/20101207002930/http://nuernberg.de/internet/bahnjahr2010/geschichte_bildergalerie.html), Gemeinfrei, <https://commons.wikimedia.org/w/index.php?curid=8730959>

## Nuremberg Institute of Technology

- Ohm's Law (Ohm)
- First Railway in Germany
- First Steel (Chain) Bridge in Germany (Kuppler) – and eldest in Europe (1824)
- ...



Von Joachim Thiel, Nbg. - Eigenes Werk (Originaltext: eigenes Foto), CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=43378452>

---

## Nuremberg Institute of Technology

- Ohm's Law (Ohm)
- First Railway in Germany
- First Steel Bridge in Germany (Kuppler)
- Fabrication of Colouring Agent Ultramarine (Leykauf)
- First High Voltage Transmission Line (Boveri)
- ....

## Industrial Area Nuremberg

- Siemens, Bosch, Areva, Semicron, Leoni, Continental, Diehl, MAN....
- Hundreds of small and medium size companies

# Twelve Departments

## 4 areas of education



Applied Mathematics and Physics  
and General Applied Sciences (AMP)



Applied Chemistry (AC)



Architecture (AR)



Civil Engineering (BI)



Economics (BW)



Electrical and Precision  
Engineering and IT (efi)



Design (D)



Computer Science (IN)



Mechanical Engineering and  
Building Services (MB/VS)



Social Science (SW)



Process Engineering (VT)



Materials Technology (WT)



## Bachelor's Degree

- Electrical Engineering and Information Technology
- Mechatronics / Precision Engineering
- Media Engineering
- Medical Device Technology

## Master's Degree

- Applied Research in Engineering Sciences
- Electronic and Mechatronic Systems
- Software-Engineering (continuing education)







- ca. 13.500 Students in Winter 2015/16  
**2.035 in efi Department**
- 3.615 Freshmen in Winter 2015/16  
**654 in efi**  
**(incl. 53 master, 10 cont. educ.)**  
(2014/15: 629 incl. 88 master)



- **ca. 300 professors**  
with long-term professional experience:  
mostly recruited from leading positions in  
industry  
**(57 in efi)**
- **More than 360 lecturers from industry and  
other companies**  
**(more than 100 in efi)**

## THN Staffing:

- All Professors and lecturers have strong industrial background:
  - Usually about 5 years work/research at a University...
  - At least 3 year employed outside Universities
  - Mostly 5-10 years
- Most of them still have good contacts to their companies and partners  
⇒ they know what is required....

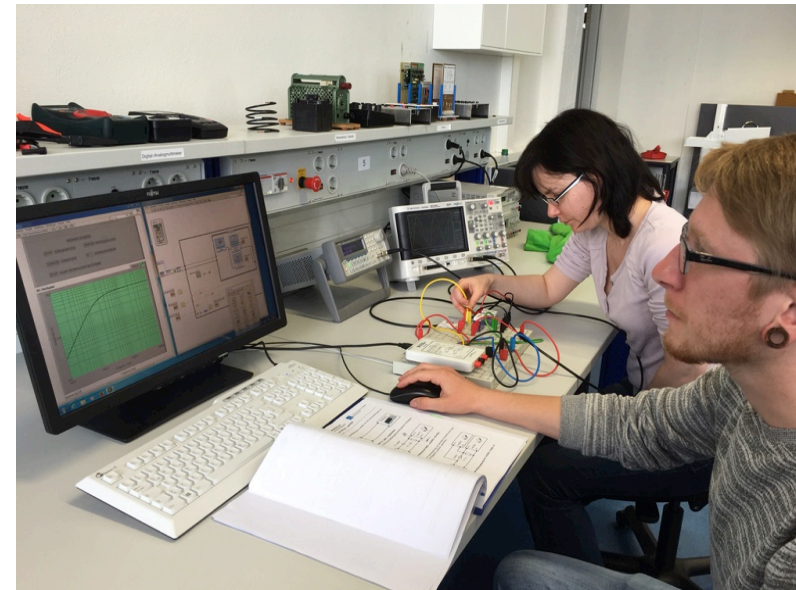


## Curriculum development:

- Driven by Professors
- Strong focus on “what’s needed outside”

## Goals of study programs at THN:

- Get solid theoretical background!
- Get practical experience during the study program
- Get exposed to state-of-the-art tools
- Get inside companies





- 
- Lot of lab exercises starting already in 2nd Semester
    - Basics of Information Technology
    - Hardware ( = electronic circuit) development
    - Programming and software development
    - Test and measurement
    - ....
    - All using modern equipment

- 
- Internship during the 5th semester **mandatory** at company
    - 20 weeks (4 days per week)
    - “engineers alike” work required
  
  - Concurrent seminar on Fridays
    - Reporting of performed tasks
    - Presentation of results to peer group
  - Written Report (20 pages) at the end of the placement
  - Students return back with different “view to (engineering) life”

- 
- Teamwork of 3-6 students building their first “own” project
  - During the 6th semester, min. 12 hours per week
    - Project definition
    - Specification
    - Project planning
    - Meeting reports (after biweekly meetings with Professor)
    - Definition of interfaces
    - Time management
    - Presentation of results
    - Project seminar (with English presentations)
      - Scientific “paper” (in English)
  - Goal: Get a view into real life project planning and execution
  - Train teamwork (and experience the pitfalls 😊)

- 
- 95% done at company
  - Real engineering project
  - Get into a company (and maybe a future employer)
  - Final presentation at company and University (mandatory)



---

“Duales Studium” = work & study program

- Student employed at company
- Getting (small) salary
- Obligated to work during most of the time in semester break and one day per week at company
  - No additional internship required
  
- Students preselected by companies (mostly already got some kind of education there)
  - Mostly “good” students
- Smart approach for companies to attract and keep future “high performers”
- About 25% of all our students in efi department

- 
- Students successfully passing exam do have
    - Solid theoretical background (hopefully....)

***AND***

- Good understanding about requirements and life in companies
- Even in economical bad times most of them find employment easily (and in short time)

**Thanks you for your attention!**

Questions?

Contact: [michael.chowanetz@th-nuernberg.de](mailto:michael.chowanetz@th-nuernberg.de)