

# Industry and education in electrical engineering

LABORATORIES, CURRICULUM AND DOCTORAL  
POSSIBILITIES

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SZILVIA NAGY

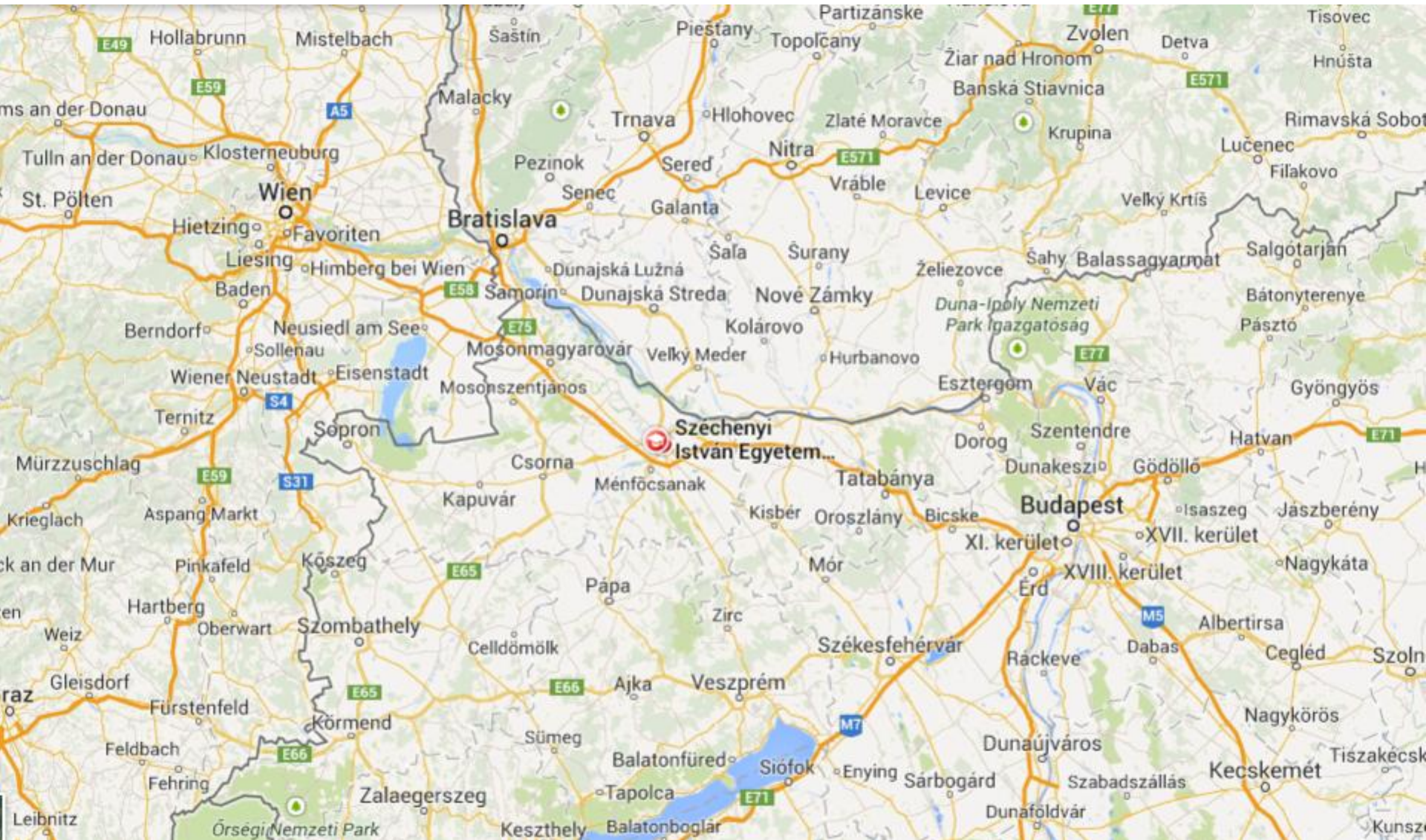
3RD FEBRUARY, 2015.

# Location of the Széchenyi University





# Location of the Széchenyi University













## Historical forerunners:

18. century: Jesuite Academy

18-19. century: Royal Academy

## Direct predecessor

1968. College for Telecommunication and Transport

1980 – expanding the training range

1993. main goal is to develop into university

1994 – new fields: economy, law, music, medicine

## Széchenyi István University:

2002. becoming a university

2005 – Introducing the Bologna system



## Faculties and Institutes:

- **Faculty of Engineering Sciences**
- Deák Ferenc Faculty of Law and Political Sciences
- Kautz Gyula Faculty of Economics
- Petz Lajos Institute of Health and Social Sciences
- Varga Tibor Institute of Musical Art

## Students of the University:

7000-8000 full time

3000-5000 corresponding





## Faculties and Institutes:

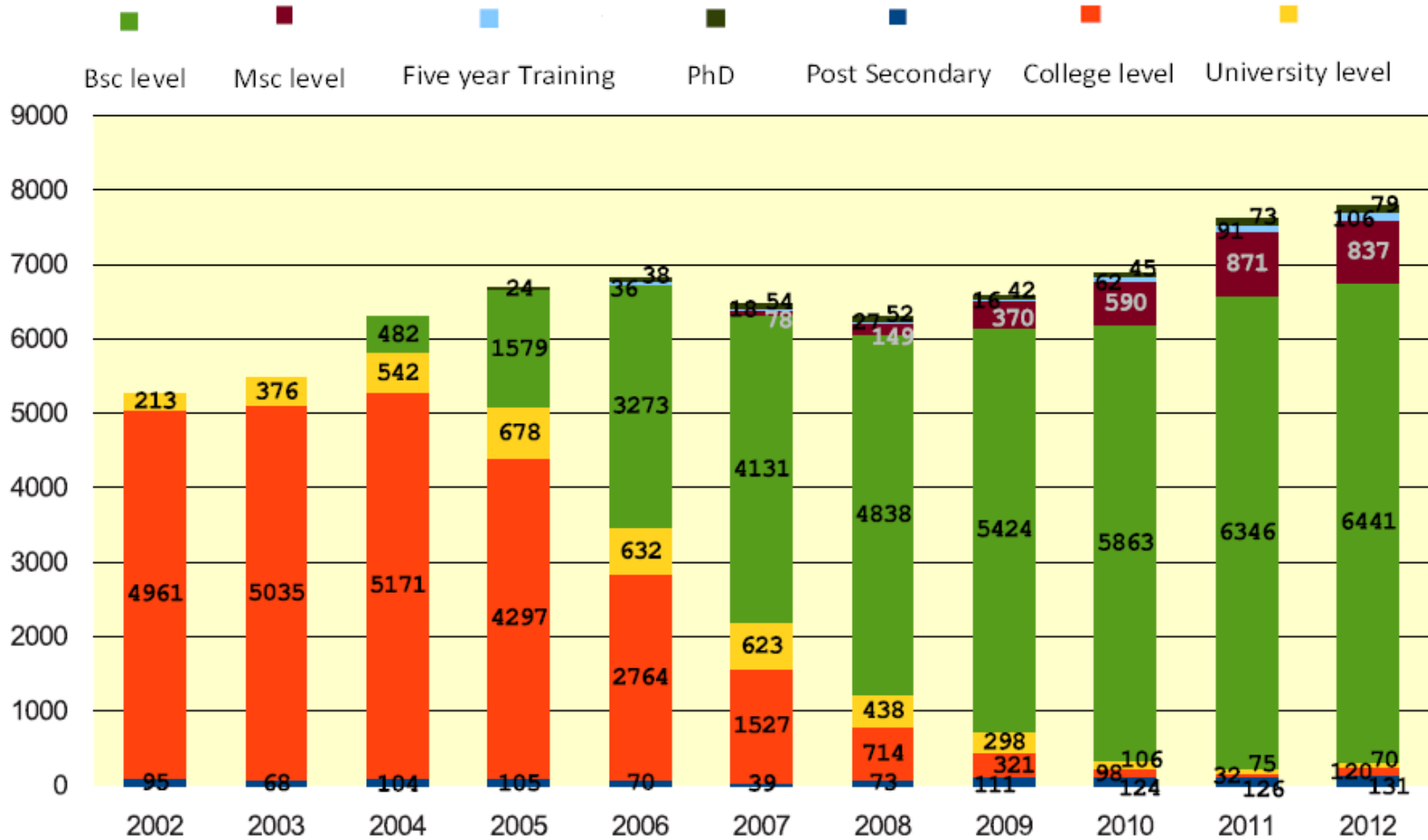
- **AUDI Hungaria Faculty of Vehicle Engineering**
- **Faculty of Architecture, Civil and Transport Engineering**
- **Faculty of Mechanical, Computer and Electrical Engineering**

## Students of the 3 engineering faculties:

7000-8000



# Students in Engineering Sciences





- Until 1995
  - College degree (BSc / FH) - 3 years
- From 1995 to 2004
  - College degree (BSc/FH) - 3 years
  - University degree (MSc/Dipl.-Ing.) - 5 years
- From 2005 and 2006 (full Bologna system)
  - BSc. – 3-3.5-4 years
  - MSc. – 1.5-2 years
  - PhD. – 2-4 years

- Accredited B.Sc. And M.Sc. Training
  - B.Sc.: since 2005, 7 semesters, 210 credit points.
  - M.Sc. Since 2009, 4 semesters, 120 credit points.
- Specializations
  - Automation
  - Infocommunications
- Possibility to continue education and research in the Multidisciplinary Ph. D. School of the Faculty of Engineering Sciences: 6 semesters, 180 credit points.



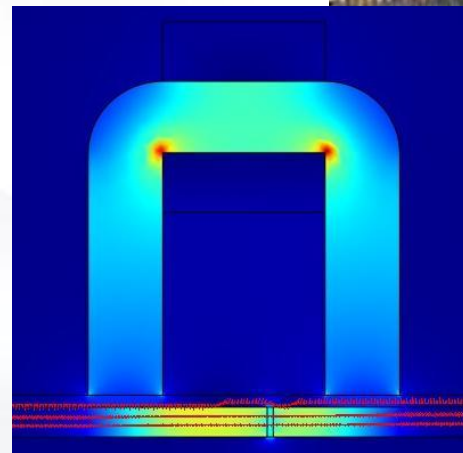
## Radio systems

- Antennas, wave propagation
- Microwave techniques
- Satellite telecommunications systems
- Radio, TV and video systems
- Mobile telecommunications
- Studio techniques
- Acoustics engineering
- Interactive TV systems



## Electromagnetic fields

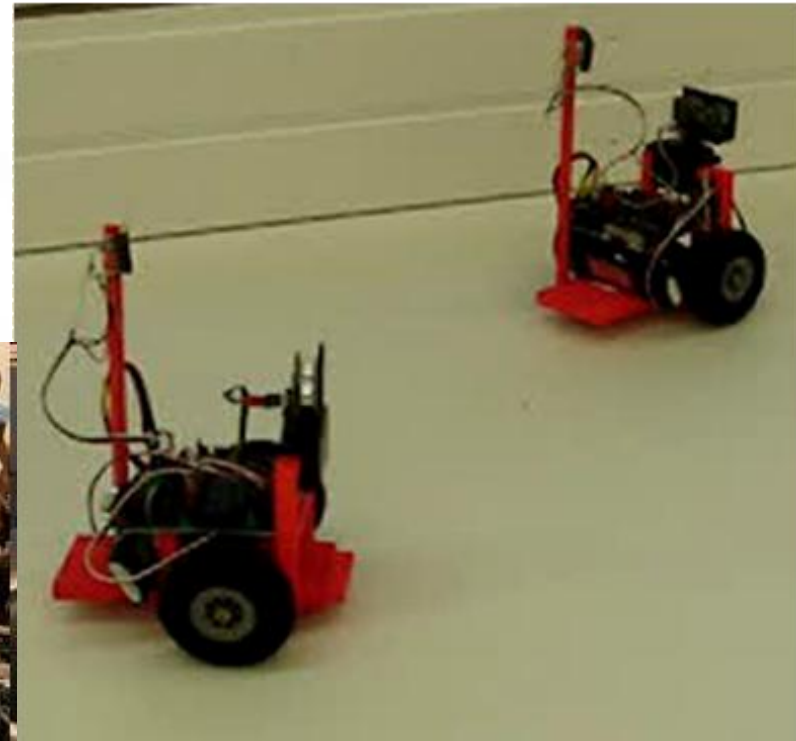
- FEM simulations
- Magnetic hysteresis modeling
- Wave propagation modeling
- Electromotors





## Control theory

- Vehicle control
- Vehicle groups
- Fuzzy logic
- Evolutionary algorithms



## Infocommunications

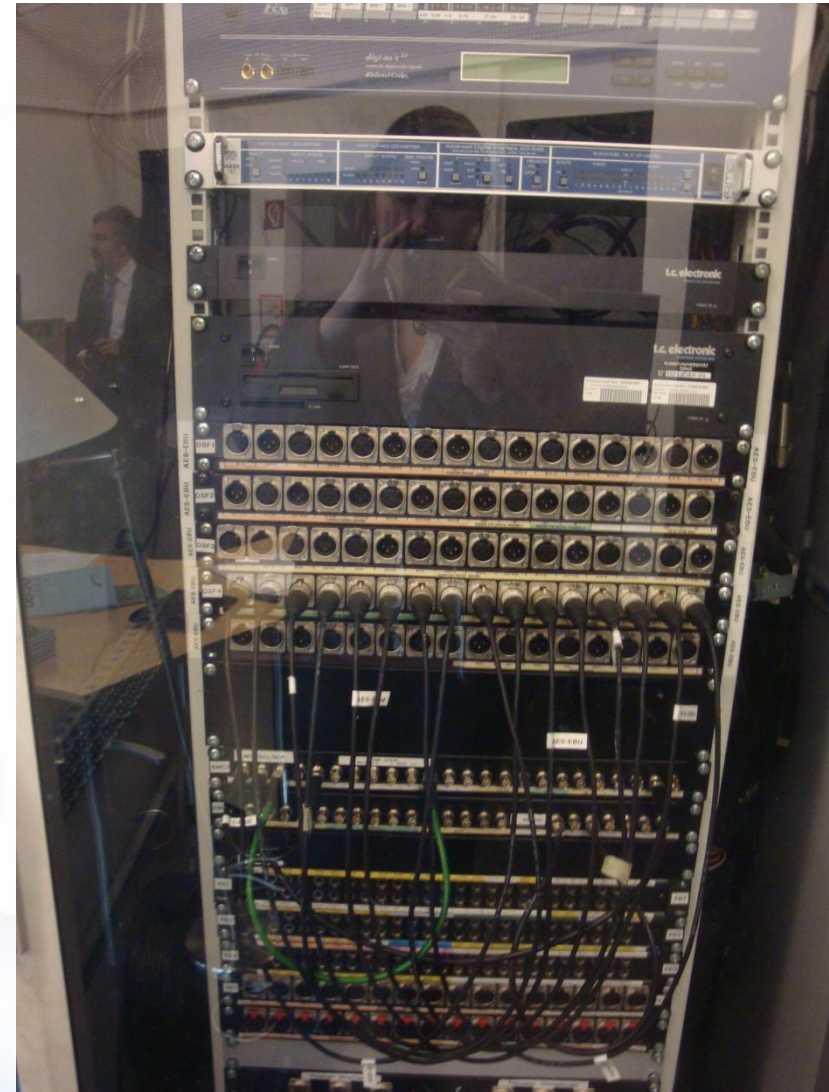
- Network operation systems
- Communications system programming
- Infocommunications networks
- Protocols and softwares
- Network security
- IP systems, IPv changes





## Telecommunications

- Communications networks
- Switching technology
- Optical telecommunications
- Network design
- Communications media



## Acoustics

- Studio Techniques
- Music studio practice
- Acoustical aid for visually impaired
- Acoustical models
- Acoustical measurement and planning



## Laboratories:



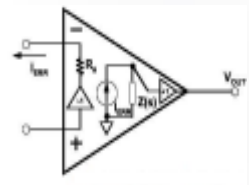
- Accredited RF Test Lab.



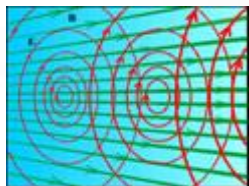
- Audio and Video Techniques R&T Lab



- DSP Voice and Image Processing Lab



- Electronic Circuits Lab



- Electromagnetic Fields Lab



- Microwave techniques Lab



- Microcontroller Lab



- Satellite and Cable TV Lab + DVB



- High Frequency Lab



- Radio Techniques Lab



- Infocommunications R&T Lab



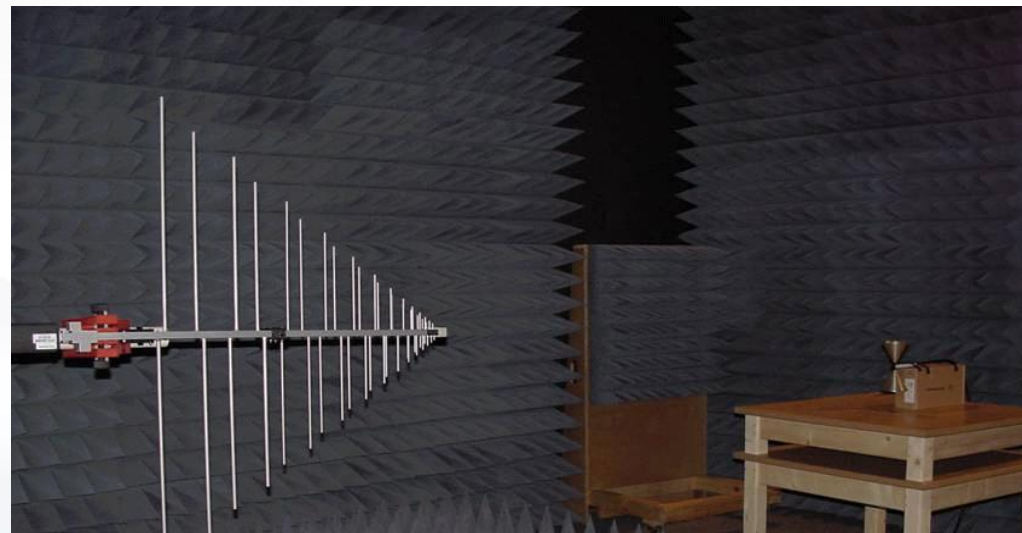
- TV techniques Lab



- Wired Telecom Lab



## RF test Laboratory

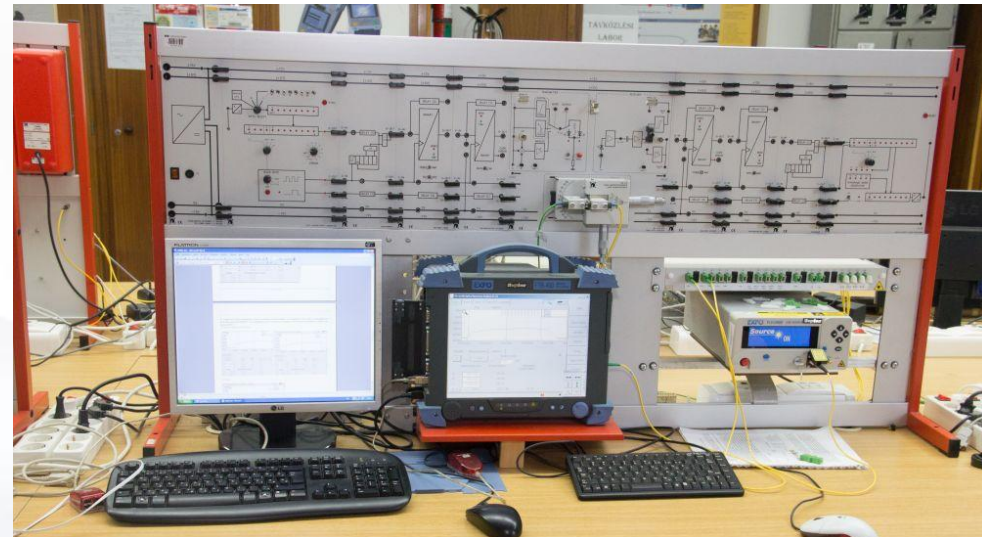
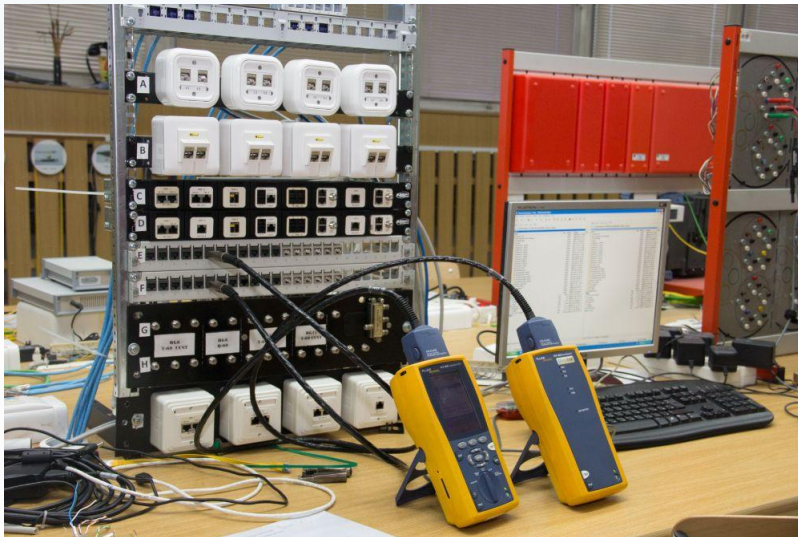


## Infocom laboratory



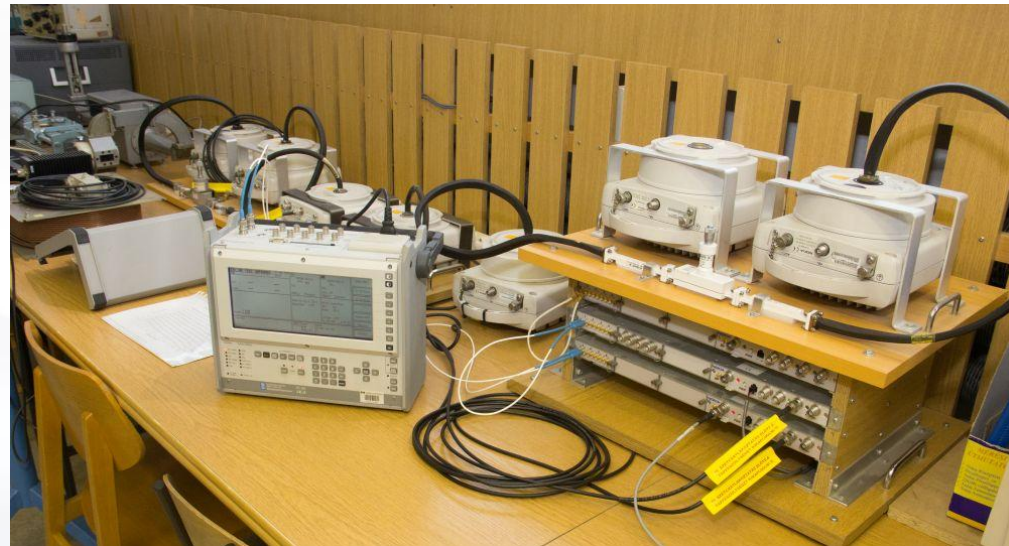


## Telecommunications laboratory

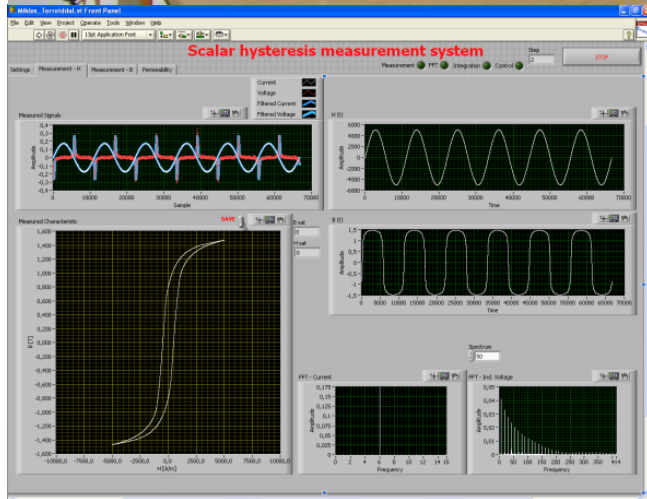




## Microwave laboratory



## Electromagnetic fields laboratory



Module - Magnetostatics (emqa2) : 01\_TFIFL\_pici\_szigma\_5\_vec\_1.mph

Subdomain Settings - Equation System

Subdomain selection	weak	dweak	constr	bind.weak	Init	Elem
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

weak terms

$$-(T0zy-T0yz)*(T0zy\_test-T0yz\_test)+(T0z-$$

$$0)*((T0zy-T0yz)*(T0zy\_test-T0yz\_test)+(T$$

$$0zy)*(T0z\_test-T0zx\_test)+(T0yx-T0xy$$

$$yx\_test-T0xy\_test))$$

$$j^*w*mu0*(Flx*test(Flx)+Fly*test(Fly)+Fz*test(Fz))$$

Free Mesh Parameters

Global Subdomain Boundary Edge Point Advanced

Predefined mesh sizes: Extra coarse

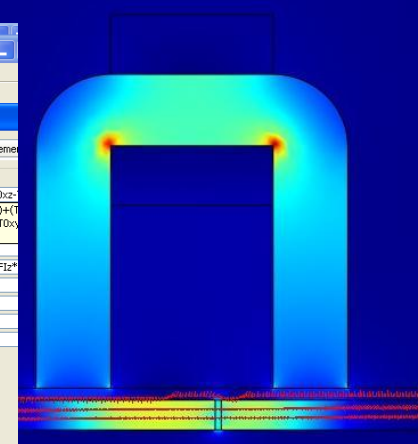
Custom mesh size

Maximum element size:

OK Cancel Apply Help

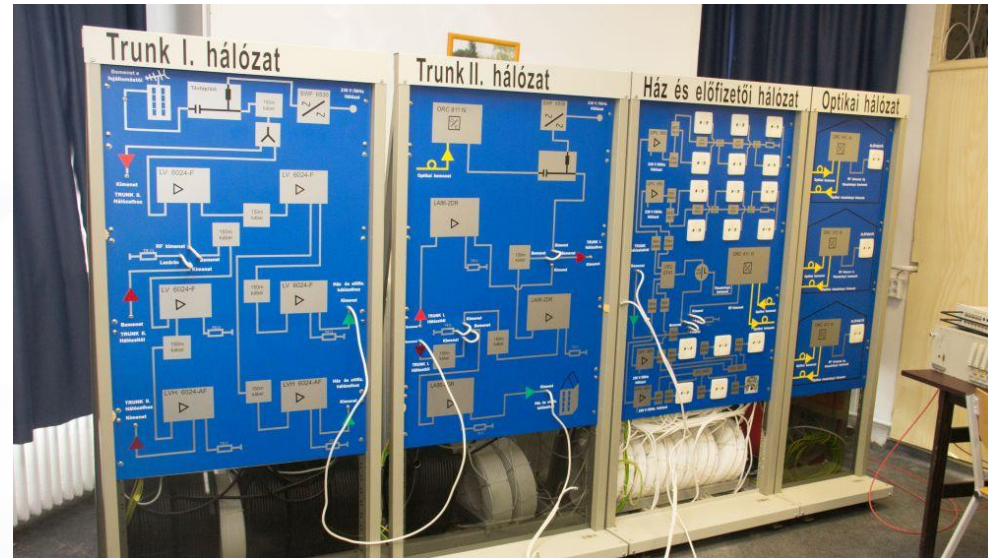
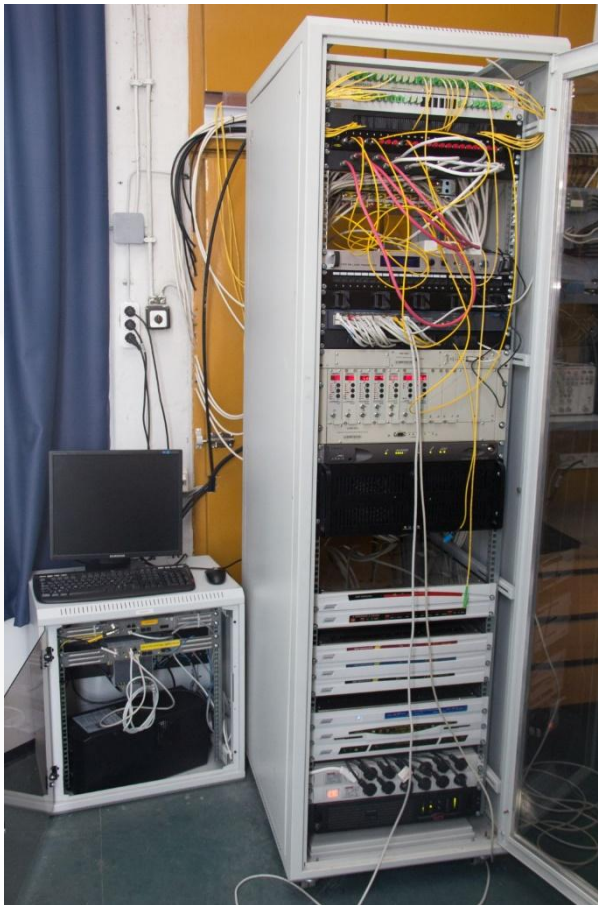
x component: Tzy-Tyz  
y component: Txz-Tzx  
z component: Tyx-Txy  
Unit: T

Arrow positioning  
Number of points: Vector with coordinates



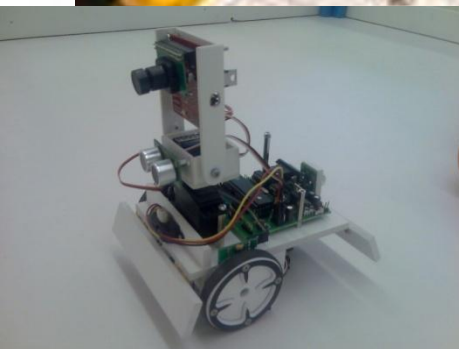
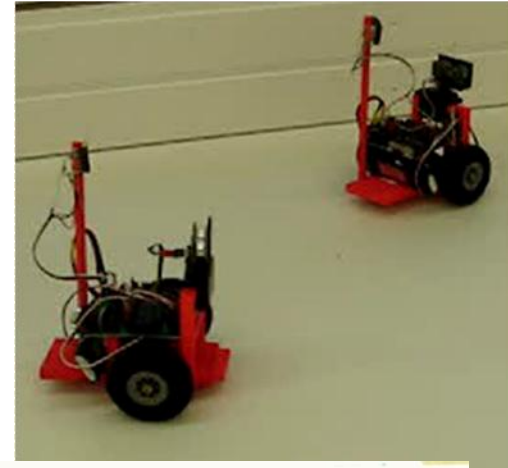


## iTV and DVB Laboratory





## Intelligent robots laboratory



# Multidisciplinary Doctoral School of Engineering Sciences

MODELING AND DEVELOPMENT OF  
INFRASTRUCTURAL SYSTEMS

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## Doctoral Schools:

- Multidisciplinary Doctoral School in Engineering Sciences
- Multidisciplinary Doctoral School in Economics and Regional Sciences
- Multidisciplinary Doctoral School in Law and Political Sciences



# About the Multidisciplinary Doctoral School of Engineering Sciences

This Multidisciplinary Doctoral School focuses its activities according to the research interests of the Faculty of Engineering Sciences. The main disciplines:

- **civil engineering**
- **information technology**
- **transportation engineering**

The Head of the Doctoral School is **László Keviczky**, a full member of the Hungarian Academy of Sciences (HAS) who used to serve as Secretary General and Vice-President of HAS. He is also a member of the Royal Swedish Academy of Engineering Sciences.

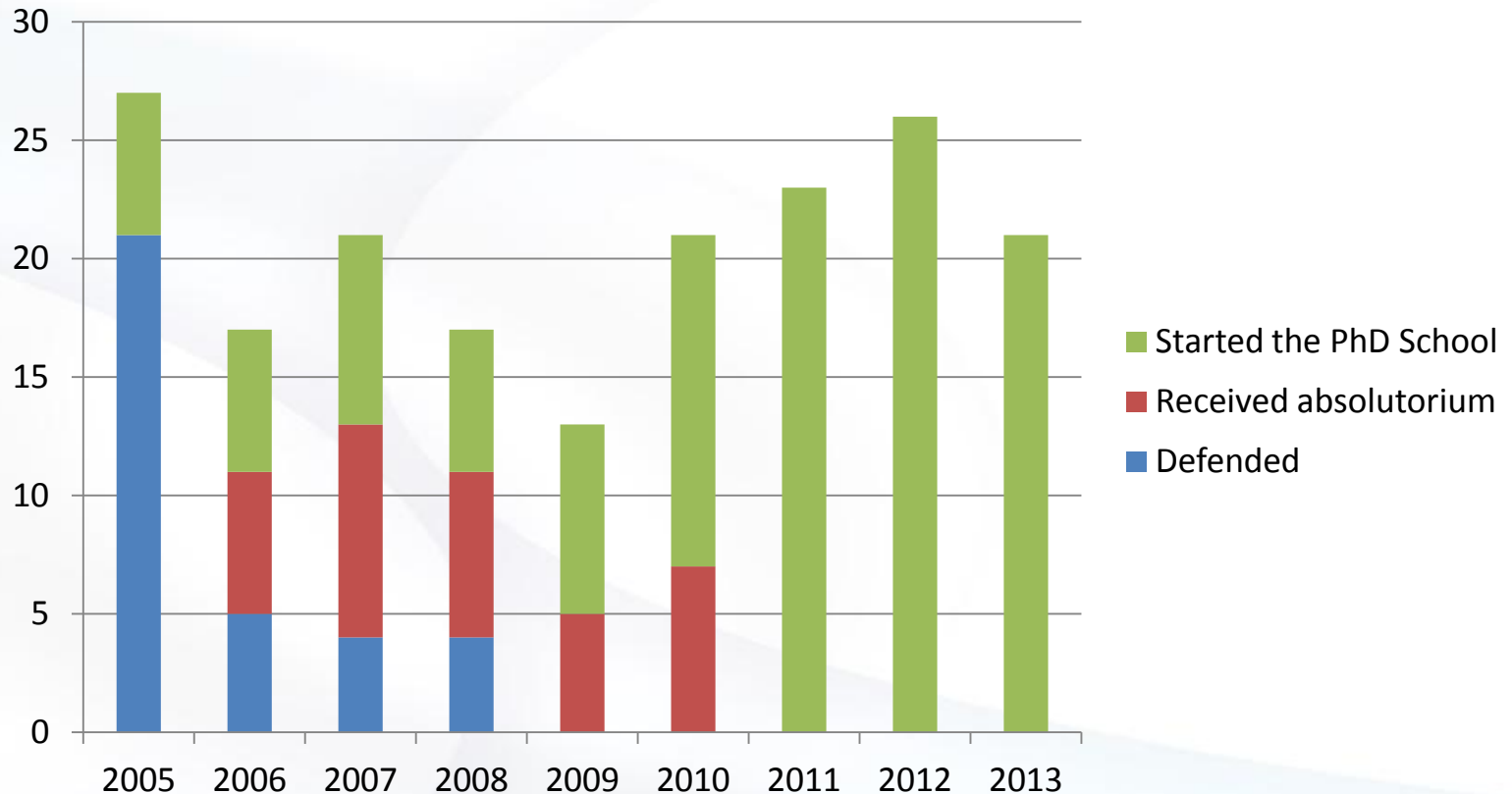
Doctoral School's main body is the Doctoral Board, with 13 members, they represent the three disciplines, and other Hungarian universities.

The Doctoral Board has an Operative Committee with only the leaders of the fields of science,

- Prof. László Gáspár – civil engineering
- Prof. László T. Kóczy – information technology
- Prof. Péter Várlaki – transport engineering

The secretary of the Doctoral School is the deputy dean of science of the Faculty of Engineering Sciences, Szilvia Nagy

## Number of students vs. starting years





The Doctoral School's curricula consists of 180 ICT credit points, divided to subject groups according to the following

		Semester 1	Sem. 2	Sem. 3	Sem. 4	Sem. 5	Sem. 6	Total
Course work		20	20	12	8	-	-	60
Research work		6	6	10	12	12	14	60
Creative	Publication	-	-	4	6	18	16	44
Activities	Education	4	4	4	4	-	-	16
Total		30	30	30	30	30	30	180

- **Methodological and general fundamental subjects**

The aim of the methodological subjects is to introduce the students to essential procedures of research methodology of engineering sciences.

- **Basic subjects of the selected specialization**

The basic subjects of the selected specialisation, expand the students' general knowledge, place it in a new light and at the same time assist in the foundation of the course programme.

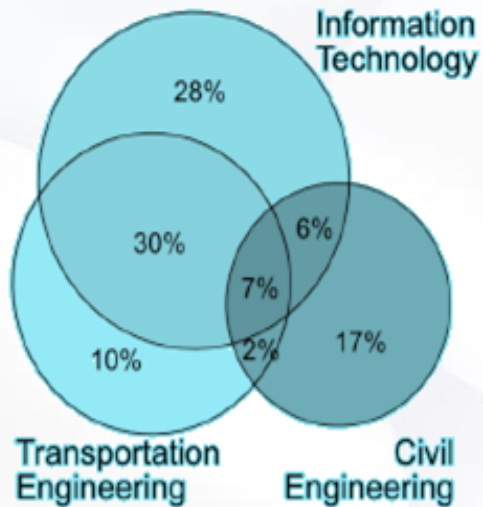
- **Highly specialized subjects**

This subject group offers the possibility to extend the knowledge in various, very specialized research topics.

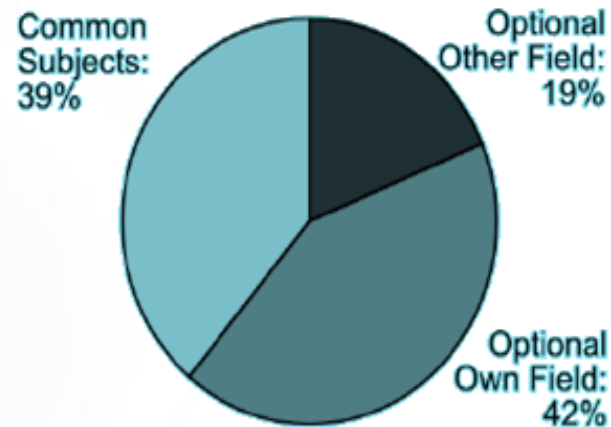
The Doctoral School encourages its students to subjects from other than their chosen specialization, too.

Multidisciplinary of the students:

Research topics  
selected by the students



Studied subjects





# Publication activity of the PhD students

Ph.D. students must participate in the work of the department or the research group that is in connection with their special field, both in academic and in publicational senses. The required publication activity is at least 14 points.

Citations of their work, and Impact factors mean extra points

Type	Points
Scientific monograph	10
Book segment, chapter (in scientific volume)	5
Article in edited volume (non-conference)	4
University lecture notes	--
Reviewed article in foreign journals	6
Reviewed article in journals edited in Hungary	4
Non-reviewed articles	1
Reviewed article in conference publication	3
Patent	2
Numbered Technical Report published at foreign university	1

The scientific journal of the Faculty of Engineering Sciences was established in 2008.

Every article published in the journal is reviewed in advance of publication and receives a DOI number.

