Wroclaw University of Science & Technology

Faculty of Electrical Engineering
- education, research, cooperation

http://www.portal.pwr.edu.pl
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EUROPEAN CAPITAL OF CULTURE
WROCLAW 2016

70th ANNIVERSARY
WROCLAW UNIVERSITY OF TECHNOLOGY

Wroclaw University of Science and Technology

Politechnika Wroclawska
Faculty of Architecture
Faculty of Civil Engineering
Faculty of Chemistry

**Faculty of Electronics (FacEl)**

Faculty of Electrical Engineering (FacEE)

Faculty of Mining Engineering

Faculty of Environmental Engineering

Faculty of Computer Science and Management

Faculty of Mechanical and Power Engineering

Faculty of Mechanical Engineering

Faculty of Fundamental Problems of Technology

Faculty of Microsystem Electronics and Photonics

Faculty of Pure and Applied Mathematics
Wroclaw University of Technology

- 35 000 students
- 4 000 employees
- 260 buildings with new laboratories
- 3 500 students’ dormitory capacity
- 41 major directions of study
- 26 English programmes

FacEE
- 1900 students
- 90 acad. teachers
- 3 major directions
- 2 Eng. programmes

WrUT at present
Faculty of Electronics

- Department of Electronic and Photonic Metrology
- Department of Computer Systems and Networks
- Department of Field Theory, Electronics and Optoelectronics
- Department of Telecommunications and Teleinformatics
- Department of Acoustics and Multimedia
- Department of Signal Processing Systems
- Department of Cybernetics and Robotics
- Department of Automatics, Mechatronics and Control Systems
- Department of Computer Science

www.weka.pwr.wroc.pl
Faculty of Electronics - Education

6,000 students

- Control Engineering and Robotics
  - Embedded Robotics
- Electronics and Telecommunications
  - Advanced Informatics and Control
  - Modern Telecommunications
  - Advanced Applied Electronics
- Computer Science
  - Internet Engineering
- Teleinformatics

FacEl major directions and MSc English programmes
Faculty of Electrical Engineering

➢ **Department of Electrical Engineering Fundamentals**
Theory of Electrical Engineering, High Voltage Technology, Electrotechnology

➢ **Department of Electrical Power Engineering**
Power System Control and Protection, Power System Automation, Load Flow Control, Reliability of Power Systems

➢ **Department of Electrical Machines, Drives and Measurements**
Electrical Machines, Electrical Drives Control, Measurement Devices and Systems
Industrial Automation, Power Electronics, Robotics

http://www.weny.pwr.wroc.pl
Faculty of Electrical Engineering - Education

- **Electrical Engineering**
  - EE Fundamentals and Technology
  - Electrical Power Engineering
  - Renewable Energy Systems
  - Control in Electrical Power Engineering (MSc in English) - CPE
  - Renewable Energy Systems (MSc in English) - RES

- **Automation and Robotics**
  - Automation and Control in Power Systems
  - Automation of Machines, Vehicles and Devices

- **Mechatronics**
  - in cooperation with Faculty of Mechanical Engineering and Faculty of Microsystems Electronics and Photonic
Faculty of Electrical Engineering - Education

Standard Education Programmes (in Polish language)

1st Level
Standard BSc Programme
5 semesters

- WrUT Students
  - 4 semesters basic study
  - Diploma semester
  - BCs Thesis

BSc Degree from WrUT

2nd Level
Standard MSc Programme
4 semesters

- WrUT Students
  - 3 semesters basic study
  - Diploma semester
  - MSc Thesis

MSc Degree from WrUT

3rd Level
Standard PhD Programme
8 semesters

- WrUT PhD Students
  - 4 semesters regular study
  - Research Didactic practices

PhD Thesis

FacEE BSc and MSc Programmes
Renewable Energy Systems (Joint MSc Programme)

WrUT Standard Programme
Structure: 4 sem.

WrUT Students
2 semesters at WrUT
3rd and MSc Thesis semester at WrUT
Degree from WrUT

UMD - WrUT Joint Programme Student’s Exchange
Structure: 2 sem. / 2 sem.*
*option for a limited number of best applicants

WrUT & UMD Students
2 semesters at WrUT
3rd and MSc Thesis semester at UMD
Degrees from both UMD and WrUT

Wrocław University of Technology

FacEE Master English Programmes
### Scientific position

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- More than 40 specialized laboratories
- 4000m² laboratories
- New Laboratory of Renewable Energy Systems Including grid integrated PV system

- In 2013 the Faculty of Electrical Engineering of Wrocław University of Technology has been assessed as the #1 among Electrical Engineering Faculties in Poland (evaluation every 4 years)
- Evaluation was based on: publications, patents, grants, cooperation with industry, international cooperation, investments in laboratories, innovations, internationalization of study
Wroclaw University of Science & Technology

Best University of Technology in Poland!

WrUST at present
Head: Prof. Ryszard Kacprzyk

Dep. Director (R&D): Dr. hab. Jacek Rezmer
Dep. Director (Education): Dr. Jaroslaw Szymanda

Research Teams (RTs):

Theory of Electrical Engineering
Head: Dr. hab. Jacek Rezmer

High Voltage Technology
Head: dr. Krzysztof Wieczorek

Electrotechnology
Head: Dr. hab. Jan Ziaja
Dept. of Electrical Engineering Fundamentals

- Mathematical methods in electrical engineering
- Digital signal processing
- Power quality assessment, wide area monitoring, LV distributed generation
- Modeling of electrical and magnetic circuits
High voltage insulation

High voltage measurement techniques

Electromagnetic compatibility

Lightning and overvoltage protection

1.8 MV pulse generator, sphere gap (1.5 m diameter)

Polymeric HV insulators, Anti-Vandal, Light, Strong, Hydrofobic
Dept. of Electrical Engineering Fundamentals

- Charge decay investigations
- Dielectrics, meas. & tech.
- Applied electrostatics
- LT plasma generation and application
- High Resistance Transfer with a double insulation system
- PP-non-woven shielding
- Back Corona in LTAP Plasma Reactor
Dept. of Electrical Power Engineering

➢ Director: Prof. Jan Iżykowski

Dep. Director (R&D): Dr. Wilhelm Rojewski
Dep. Director (Education): MSc. Mirosław Kobusiński

Research Teams:

Power System Control and Protection
Head: Prof. Eugeniusz Rosołowski

Electrical Apparatus
Head: Prof. Antoni Klajn

Electrical Engineering for Industry
Head: Dr hab. Waldemar Dolega

Power Networks and Systems
Head: Prof. Robert Lis
Dept. of Electrical Power Engineering

- **Power System Control and Protection RT**
  - Power system simulation
  - Protection of power system components (transmission networks, medium voltage distribution networks, renewable energy sources)
  - Measurement and decision making algorithms for digital protective relays
  - Artificial intelligence & adaptive techniques for power system protection and control
  - Fault location on power networks

FacEE Research
Electrical Apparatus RT

- Design of electrical apparatuses and installations
- Intelligent installations
- Economical and legal aspects of power system operation
- Investigation of electrical arc phenomena
- Power quality
Dept. of Electrical Power Engineering

- Electrical Engineering for Industry RT
  - Energy savings in industry
  - Investigation of overvoltages during switching operations
  - Electrical safety – regulations and technical means
  - Measurement of electrical fields under overhead power lines
  - Influence of electrical fields on human being
Power Networks and Systems RT

- Power system analysis and state estimation
- Diagnosis of blackouts in national power grid
- Integration of renewable energy sources into a power grid
- Power quality
- Pricing electricity at deregulated power market
Dept. of Electrical Machines, Drives & Meas.

- **Director:** Prof. Teresa Orłowska-Kowalska
  - **Dep. Director (R&D):** Dr. Marcin Pawlak
  - **Dep. Director (Education):** Dr. Krzysztof Dyrcz

**Research Teams:**

- **Electrical Machines and Measurements**
  - **Head:** Prof. Ludwik Antal

- **Electrical Drives, Mechatronics and Industrial Automation**
  - **Head:** Prof. Krzysztof Szabat
Construction and design of DC and AC machines (including permanent magnet machines)

Modeling and testing of electrical machines based on 2D/3D field and circuit-field modeling

Measurement theory

Methods and measuring circuits

Magnetic measurements

Electromagnetic compatibility

Sensors, transducers, measurement standards
Dept. of Electrical Machines, Drives & Meas.

- Controlled electrical drives
- Power electronics
- Diagnostics
- Industrial automation and informatics
- Monitoring and diagnosis of electrical drives
- Industrial automation and informatics
- Traction drives, sensorless drives, drives with complex mechanical couplings, safety drives
- Application of sliding-mode control, predictive control, adaptive and neuro-fuzzy control in AC motor drives
Selected organized international conferences

- **18th Power Systems Computation Conference (PSCC), August 18-22, 2014**
- **International Workshop on High Voltage Engineering**
- **International Conference on Environment and Electrical Engineering EEEIC (until 2010)**
- **International Symposium on Electrical Machines**
- **Electrical Power Networks – EPNet, September 19 – 21, 2016**
- **PAC World Conference, Wroclaw 27-29 June 2017**
Faculty of Electrical Engineering - Research

Selected organized international conferences

Electrical Power Networks

Konferencja Naukowo-Techniczna
19-21.09.2016, Szklarska Poręba

http://www.epnet2016.pwr.edu.pl

Wrocław 27-29 June 2017
Selected Patents

- **US (USA)**: 13 patents
- **EP (Europe)**: 6 patents
- **SE (Sweden)**: 2 patents
- **FR (France)**: 1 patent
- **CA (Canada)**: 5 patents
- **RU (Russia)**: 2 patents
- **PL (Poland)**: many

Examples:


Selected research projects:

- Cyber security of low voltage smart power grids, ERA-NET Smart Grids - Salvage
- Reliability of data transfer using different Power Line Communication technologies in LV and MV power systems
- The new generation of energy-efficient electric drives for pumps and fans for mining
- Sensors for measuring factors threats in the environment - modeling and monitoring
Thank you for your attention

www.weny.pwr.edu.pl
Что дальше?