Opportunities and challenges for teaching of smart wireless technologies

Jaroslaw Domaradzki
v-ce Dean of general affairs, Faculty of Microsystem Electronics and Photonics,
Wroclaw University of Science and Technology,
Janiszewskiego 11/17, Wroclaw, Poland
Wrocław /ˈvrɔtswəf/

- also called „Venice of the North”: 25 rivers and channels, 12 islands, >200 bridges
- historical capital city of Silesia region (first recorded in 10th century)
- European Capital of Culture in 2016
- industry: Lenovo, Siemens, Toshiba, LG, Nokia...
- 650 000 citizens (~800 000 during academic year)
- 11 public and 17 private universities and academia
Wrocław University of Science and Technology (WUT)*
Politechnika Wrocławska

*In mid 2016 name changed from Wrocław University of Technology

- one of the largest academic schools in Poland
- founded in 1945 by Polish academic teachers
- active international co-operation with academia, industry and R&D
- high position in rankings of higher education schools in Poland

WUT in numbers:
- 28,500 students
- 2,100 research & teaching staff
- 16 faculties
- 212 buildings
- 5,370 registered inventions
Faculty of Microsystem Electronics and Photonics
- founded in 2001

Facts and numbers – students and staff

Students:
• ~700 students (1st and 2nd level of studies)
• 40 PhD students (3rd level of studies)
• 7 students’ scientific associations

Academic Staff (63):
• 16 full professors
• 6 associated professors
• 2 assistant professors
• 34 adjuncts
• 7 assistants

30 technicians, administration and support staff
Fields of education

- electronics,
- metrology (electronics),
- ICT,
- micro/nanoelectronics,
- microsystems,
- optoelectronics,
- optical fibers technology,
- electronic apparatus,
- analogue and digital electronics,

Knowledge, skills and competences in the fields of micro- and nanotechnology, microsystems and photonics.
Fields of study

First degree studies (Eng, 7 semesters):

• ELECTRONICS AND TELECOMMUNICATION
  ➔ Digital Electronics
  ➔ Electronics and photonics engineering
• MECHATRONICS

Second degree studies (MSc, 3 semesters):

• ELECTRONICS AND TELECOMMUNICATION
  ➔ Optoelectronics and Optical Waveguide Technology
  ➔ Electronics, Photonics, Microsystems  (studies in English)
• MICROSYSTEMS
• MECHATRONIC MICROSYSTEMS ENGINEERING
Courses:
encompass knowledge in the field of:
- electronics,
- computer science,
- optoelectronics,
- microsystems,
- telecommunication,
- mechanical engineering,
- basics of automatics and control systems.

The curricula of courses is developed in such a way that they allow students to learn about new, dynamically developing fields of science and technology and, at the same time, give them versatile basic knowledge sufficient to be flexible in the demanding job market.
Course - **Wireless systems**: Lectures and laboratories

Course OBJECTIVES:

**Gaining the knowledge about:**
- fundamentals of data transmission in wireless systems,
- types of systems and standards used in wireless communication,
- data transmission methods in modern wireless systems.

**Gaining the skills in the field of:**
- designing and configuration of wireless data transmission
  with application of selected standards,
- designing and analysis of mobile communication systems,
- configuration of wireless data transmission in selected standards,
- designing and analysis of functioning of selected wireless systems,
- team work and preparation to conduct research in the field of wireless technologies.
IQRF Smart School Programme

25.11.2016 signing the IQRF Alliance Membership agreement and joining the IQRF Smart School
IQRF Smart School Program

March 2017 launch the Faculty website dedicated to IQRF Smart School: http://wemif.pwr.edu.pl/studenci/iqrf-smart-school
IQRF Workshops – Wireless Technologies for IoT
1st Workshop 29.11.2017, IQRF Tech. - Politechnika Wrocławska
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Participants:
62 participants, including:
- 34 students from 6 technical universities in Poland
- IQRF Tech representatives,
IQRF Workshops – Wireless Technologies for IoT

2st Workshop 29.11.2018, IQRF Tech. - Politechnika Wrocławska

42 students from WEMiF attended practical training lectures.

Alliance Membership
Launch the Faculty website
IQRF Workshops - Wroclaw
Laboratory of Wireless Systems Technologies

Developed boards for trainings

Developed IQRF kits for IoT solutions

Alliance Membership

launch the Faculty website

IQRF Workshops - Wroclaw

development of laboratory base
Laboratory of Wireless Systems Technologies

Laboratory programme for practical skills based on IQRF kits for IoT solutions:

1. Basis of IQRF mesh network,
2. Working with Sensors, Relays and I/O devices in IQRF mesh network
3. Connecting IQRF mesh to IoT using gates or up-boards
Realized diploma theses connected with IQRF technology

- Application of wireless mesh type networks for the Internet of things, 2017;
- Analysis of wireless networks in IQRF standard, 2018;
- Wireless air quality monitoring system in the teaching rooms, 2019.
Opportunities for learning of smart wireless technologies

- Lectures and practical skills in electronics, telecommunications, informatics and wireless systems offered at the Faculty,

- Lectures and practical skills at the...

- Workshops,

- Projects and Diploma theses,

- Projects within students’ scientific associations...
Challenges for teaching of smart wireless technologies

- Rapid progress in electronics requires continuous updating of knowledge and laboratory base;

- Support from the industries in teaching the students of new solutions and products – updating the knowledge database with the newest solution delivered to the market
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Faculty of Microsystem Electronics and Photonics

Laboratory of Wireless Systems Technologies

jaroslaw.domaradzki@pwr.edu.pl