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 /ˈvrɒtswəf/

- *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:

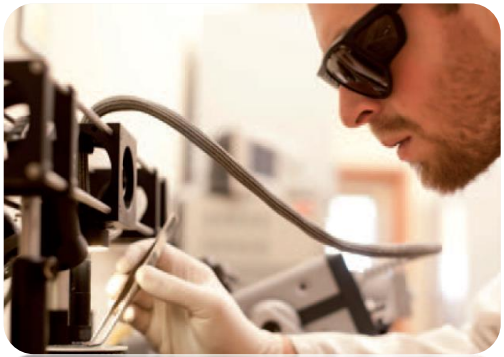
- 28 500 students
- 2 100 research & teaching staff
- 16 faculties
- 212 buildings
- 5 370 registered inventions

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):

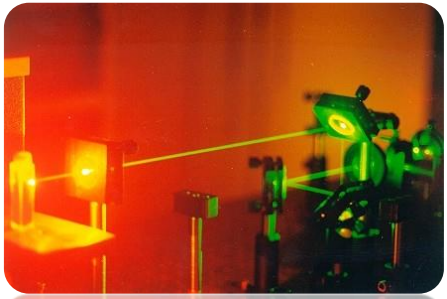
- **16** full professors
- **6** associated professors
- **2** assistant professors
- **34** adjuncts
- **7** assistants

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.

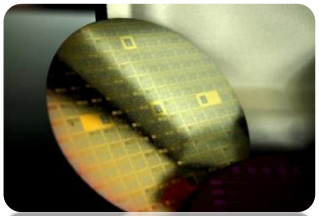
Fields of study

First degree studies (Eng,7 semesters):

- **ELECTRONICS AND TELECOMMUNICATION**
  - → ***Digital Electronics***
  - → ***Electronics and photonics engineering***
- **MECHATRONICS**

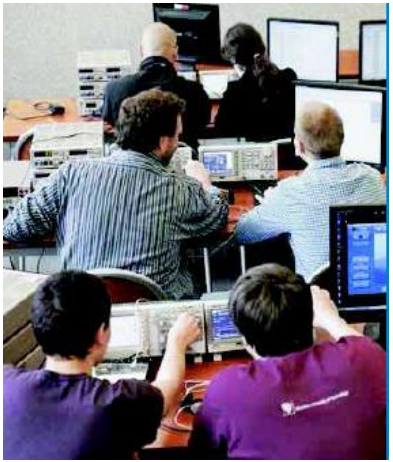
Second degree studies (MSc, 3 semesters):

- **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.

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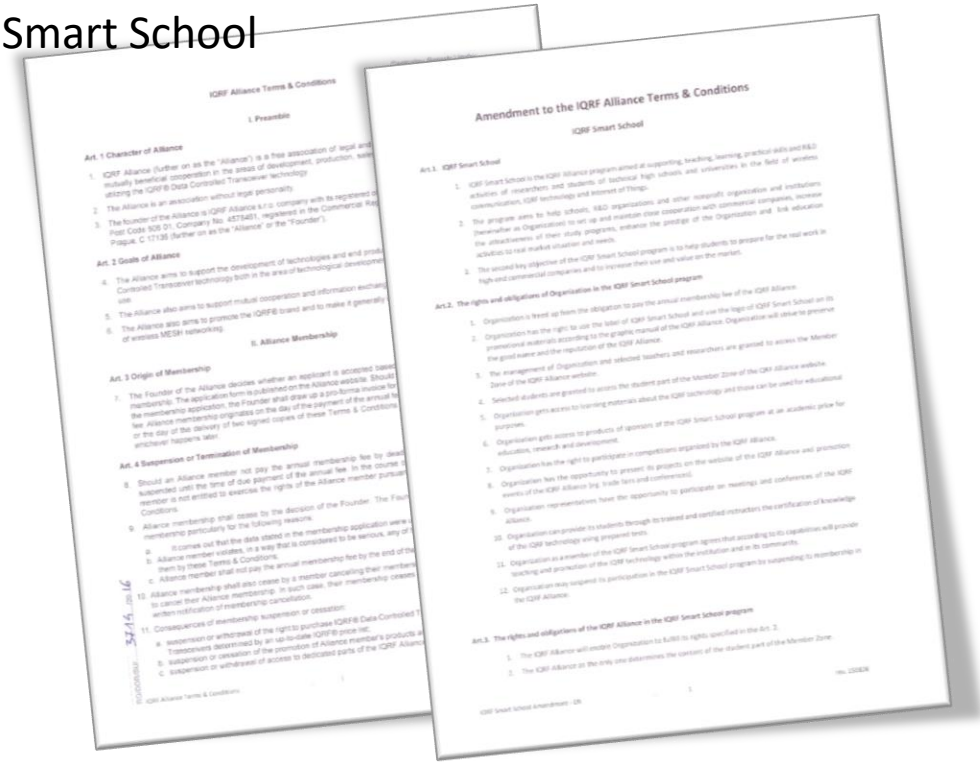
IQRF Alliance

IQRF Smart School

IQRF Smart School Programme

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

Alliance Membership



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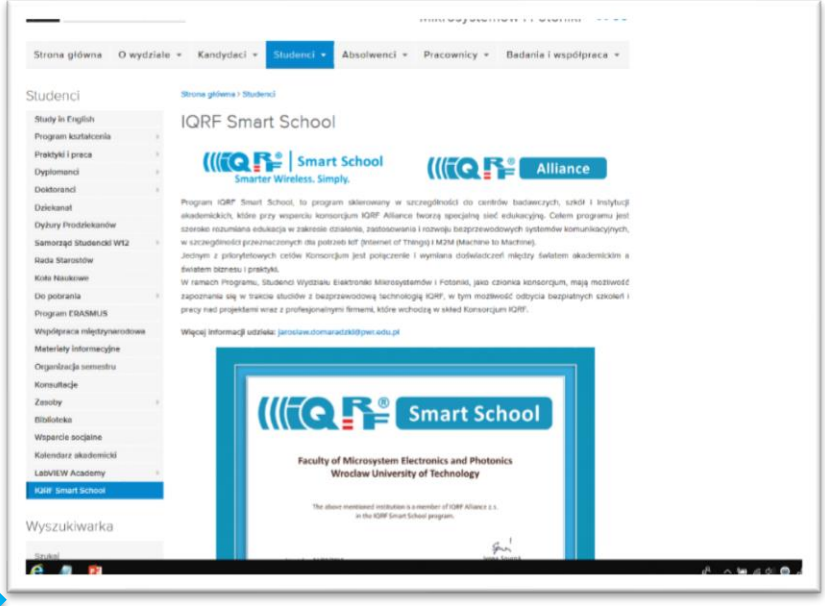
Alliance

Smart School

IQRF Smart School Programe

march 2017 launch the Faculty website dedicated do IQRF Smart School: http://wemif.pwr.edu.pl/studenci/iqrf-smart-school



Alliance Membership

launch the Faculty website

Politechnika Wrocławska

IQRF Alliance

IQRF Smart School

IQRF Workshops – Wireless Technologies for IoT

1st Workshop 29.11.2017, IQRF Tech. - Politechnika Wrocławska

Alliance Membership → launch the Faculty website → IQRF Workshops - Wroclaw

Politechnika Wrocławska

IQRF Alliance

IQRF Smart School

IQRF Workshops – Wireless Technologies for IoT

1st Workshop 29.11.2017, IQRF Tech. - Politechnika Wrocławska

Participants:

62 participants, including:

- 34 students from 6 technical universities in Poland
- IQRF Tech representatives,
- industry representaives: Teknosystem Sp. z o.o., Rabbit sp. z o.o., Perfand LED, Petrosoft.pl, COMAL Automatyka, POL-EKO-APARATURA Sp. j., Guenther Polska Sp. z o.o., GL Optic Polska, Sander Elektronik AG, Aaeon Europe, Sel Telecom S.A., FIMS, TME.

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IQRF Workshops – Wireless Technologies for IoT

2st Workshop 29.11.2018, IQRF Tech. - Politechnika Wrocławska

lectures

practical training

42 students from WEMiF attended

Alliance Membership → launch the Faculty website → IQRF Workshops - Wroclaw

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IQRF Alliance

Laboratory of Wireless Systems Technologies


TR-72D Transceiver


CK-USB-04A Programmer


DK-EVAL-04A Node kit


DDC-SE-01 Sensor kit


DDC-RE-01 Relay kit


DDC-IO-01 I/O kit


GW-WiFi-01 WiFi Gateway


Up Board

Developed boards for trainings

Developed IQRF kits for IoT solutions

Alliance Membership → launch the Faculty website → IQRF Workshops - Wroclaw → development of laboratory base

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Laboratory of Wireless Systems Technologies

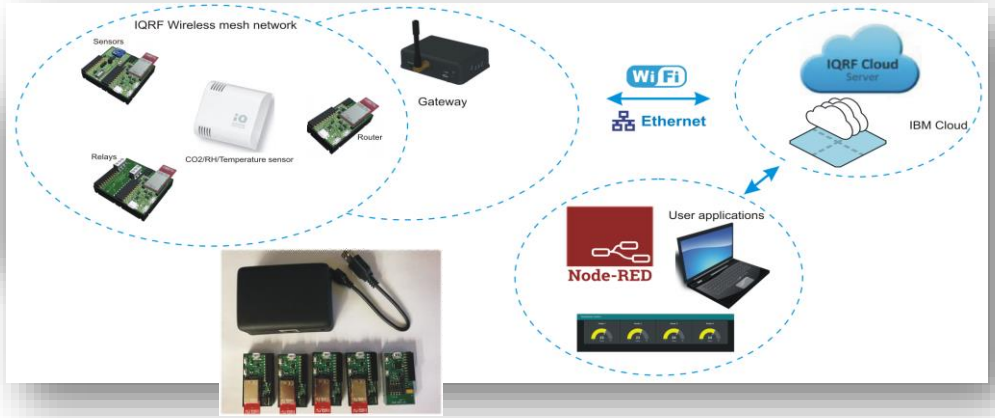
Laboratory programme for practical skills based on IQRF kits for IoT solutions:

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

Alliance Membership → launch the Faculty website → IQRF Workshops - Wroclaw → development of laboratory base

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 Laboratory of Wireless Systems Technologies
- Workshops,
- Projects and Diploma theses,
- Projects within students' scientific associations...

Challenges for teaching of smart wireless technologies

- Rapid progres in electronics requires continous 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

Acknowledgment

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Alliance

Politechnika Wrocławska

Faculty of Microsystem Electronics and Photonics

Laboratory of Wireless Systems Technologies

jaroslaw.domaradzki@pwr.edu.pl