Wrocław University
of Science and Technology

3e+

SUMMER SCHOOL 2019

About 3E+

Our Programme offers interactive small-scale courses (max. 10 students). Our courses are designed to provide an intensive, in-depth look at your topic of study. As 3E+ is open to applicants from all over the world you will engage in discussions with a unique group of peers!

Apart from lessons, you will get to enjoy our fun and exciting Social Programme! Almost every afternoon and evening we deliver a wide range of activities. From City sightseeing tours, sport activities to all day trips outside the City of Wrocław. We arrange a variety of social events to help you get to know your colleagues and Poland better while having fun!

Why Wrocław?

- one of the major academic centers in Poland
- modern, open and dynamic city with rich history and culture
- in the heart of Europe and in southwestern Poland, Wrocław is easily accessible from many other major cities
- approx. 1 million residents in the greater Wrocław area.

Why WUST?

- one of the best technical universities in Poland
- 28 815 students
- 2 165 academic staff
- 33 distinguished educational programmes, including courses taught in English and MBA programmes
- Campus located in the city center

Why 3E+ Summer School?

- 60 hours of specialized courses in a friendly atmosphere
- 4-weeks of great experience
- laboratory activities
- earn 4 ECTS points
- trips, events, social activities
- Polish language and culture course
- 7th edition
- participants from all over the world
- and much more

How much does it cost?

950 Euro

Early bird 880 Euro (application before 25.03.2019)

10% discount for students from partner institutions!

What is included?

■ tuition ■ accommodation ■ lunches on weekdays ■ welcome and fare-well dinner ■ trips, events and social activities ■ welcome pack

...and not included?

■ airfare and visa's cost (if required) ■ insurance ■ living expenses

When?

1st – 26th July 2019

Application deadline

30th April 2019

3e+ offer

Choose one of our courses and earn 4 ECTS points:

- Auditoria Design – Architectural Acoustics
- Quality Control and Technical Evaluation of Building and Civil Engineering Structures
- Green Fuels and Environment
- Acceptance and Operating Tests of Electrical Installations and Devices
- Power Quality
- Programmable Logic Controllers PLC
- Renewable Energy Systems in Engineering Simulations
- Thermal Comfort and Renewable Energy for Low Energy Buildings
- Design Thinking for Innovation in 21st Century
- Renewable Energy Sources in Household and Power Sector
- Foundation of Quantum Information and Communication
- Ceramic Microfluidic Devices for Gas Sensing
- Lab-chip Devices Assembled with Optoelectronics
- MEMS and Mechatronic Systems with LabVIEW
- Microsystems- do you know what the MEMS are?
- Anomalous Diffusion Models with Application to Biological Data
- Introduction to Data Science with Python

Auditoria Design – Architectural Acoustics

FACULTY OF ARCHITECTURE

Gain theoretical knowledge and practical skills in shaping architecture for its' optimal acoustical performance. The combination of studio design workshop form with broad knowledge on sound and architecture – with their mutual influence – passed on lectures and seminars, allow participants to gain usable and thorough understanding of acoustical field properties in a room planning. Comprehensive review connected with projects of diversified auditoria halls, meant for: speech, music, art performance or religious celebrations – like concert halls, theatres, opera houses, temples, higher education rooms – are aiming at enriching and expanding knowledge on architectural acoustics of students majoring in architecture.

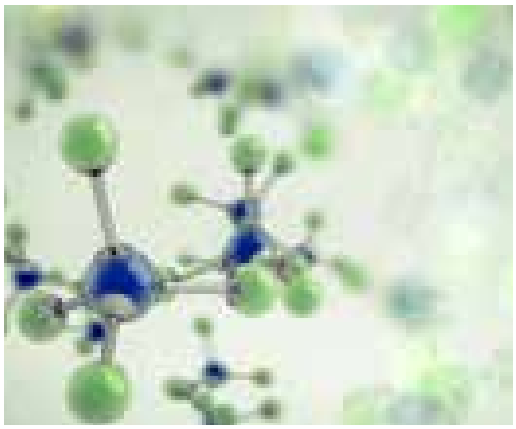
Quality Control and Technical Evaluation of Building and Civil Engineering Structures

FACULTY OF CIVIL ENGINEERING

Gain knowledge concerning procedures and advanced testing methods which can be applied for quality control and technical evaluation of different building and civil engineering structures. The course will introduce you to basic principles and practical applications of several modern testing systems. Particular attention is focussed on the NDT methods (Non Destructive Testing) that can be applied for „in-situ" examination. One of the most important aspects of proposed course is to offer you a possibility for practical training in using modern testing systems in laboratory and „in-situ" conditions.

Green Fuels and Environment

FACULTY OF CHEMISTRY



Gain knowledge about fuel properties, with particular emphasis on biofuels, and the impact of their use on environmental protection. Learn about fuel economy - types of fuels, standards, the ability to manufacture and store fuels, etc.
Understand the characteristics of liquid and gaseous fuels in relation to the composition of fumes in terms of their impact on the natural environment. Get an insight into technologies for the production of fuels, especially alternative fuels and biofuels along with the use of new separation methods for the purification of waste streams and the recovery of valuable compounds,
Explore issues related to the use of supercapacitors and lithium ion batteries that affect the development of motoring.

Acceptance and Operating Tests of Electrical Installations and Devices

FACULTY OF ELECTRICAL ENGINEERING

Gain knowledge about basic concepts and practical aspects related to electric shock protection in low voltage installation and evaluation of safety work of electrical devices. Learn about evaluation methods of the protection effectiveness. Studied methods are: examining the effectiveness of protection by automatically turning off the power in circuits with RCDs, resistance and continuity of the protective and equipotential bonding conductors testing. Measurements of standing resistance, effective touch voltages and loop impedance. Get an insight into diagnosis of appliances

and installation by thermal imaging studies, using of M2M measurer of efficiency and computer programs. Apply the measurements made during laboratory classes to create the final report evaluating installation condition and conditions of electrical equipment work.

Power Quality
FACULTY OF ELECTRICAL ENGINEERING

Explore the basic problems and practical aspects of power quality assessment in power systems. Gain knowledge about classes of power quality problems, standards, power quality measurement, chosen algorithms for power quality assessment. Get a hands-on experience during a laboratory project based either on emission and immunity test of selected load or on assessment of power quality using real measurement in power systems.

Programmable Logic Controllers PLC
FACULTY OF ELECTRICAL ENGINEERING

Get an insight into Programmable Logic Controllers industrial cases. Prepare PLC configuration, design and develop solutions for some common practical problems, design and program the distributed system using programmable controllers! The course is focused on explanation of the practical problems encountered in Programmable Logic Controllers (PLC) on the basis of the Siemens family SIMATIC S7-1200 and S7-1500. Learn to understand:

■ basic aspects of PLC application in industry ■ PLC operation of basic peripherals ■ graphical languages (LADDER or FBD) ■ basic programming tools ■ arithmetic and logic operations ■ timers and counters ■ latches and flip-flops.

Renewable Energy Systems in Engineering Simulations

FACULTY OF ENVIRONMENTAL ENGINEERING

Get an insight into the engineering simulation tools for the renewable energy systems and energy consumption in buildings. Understand a range of applications from the simple to the complex ones, for example: PVGIS, EED, RETScreen, TRYNSYS, EDSL TAS. Learn about solutions for energy production in buildings based on solar thermal collectors, PV panels and air-to-water heat pumps. You will participate mostly in active forms – laboratories, covering the data collection and computer analysis.

Thermal Comfort and Renewable Energy for Low Energy Buildings

FACULTY OF ENVIRONMENTAL ENGINEERING

Learn to understand the holistic approach to the design of the low energy demand buildings with special emphasis on the utilisation of renewable energy in building installations, application of heat recovery systems and maintaining thermal comfort of users. The course focuses on the subject of thermal comfort, heat production (to supply heating and domestic hot water systems) with additional aspect of passive cooling and heat recovery through ventilation for low energy buildings. Get an insight into solutions based on sustainable design including, among others, solar thermal collectors, air-to-water heat pumps, energy recovery heat exchangers in air handling units and ground heat exchangers. You will participate mostly in active forms like laboratory, calculus and simple project.

Design Thinking for Innovation in 21st Century

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

21st century is driven by Innovation. It has changed the way we live, do business, travel, communication and everything else that one might think of. Whether you want to be an engineer, a manager, an entrepreneur, a teacher, a researcher or a politician; expectations from you would be to do the most with the least resources. This is where 'Deigning Thinking' comes in! It's a tool that will be helpful to you at any level, any role and in any organization you work in or run. Designing Thinking also equips you to become an innovative thinker and to unearth creative opportunities that are around you. This module at the 3E Summer School, is designed to familiarize you with the concept of designing thinking, you understand each stage of the process and apply all of it for a practically feasible project. This course can be attended by individuals from any level & field. The only criteria for acceptance are having passion, dedication & will, to be Innovative & Creative.

Renewable Energy Sources in Household and Power Sector

FACULTY OF MECHANICAL AND POWER ENGINEERING

The laboratory course is focused on the experimental research on various types of renewable energy like: solar energy, biomass energy, hydrogen energy. Get an insight into the solar energy subject. Gain knowledge about collectors types, computational models of solar collectors and applied construction materials. Learn about the use

of solid renewable fuels and production of hydrogen with the capacity adequate for domestic and power sector up to 200MW. Perform efficiency measurements on the solar energy conversion, biofuels combustion and hydrogen production, calculation, analysis and comparison of obtained results. Gain knowledge about the calculation and modeling of solar installations, biomass combustion and pollution control, hydrogen production.

Foundation of Quantum Information and Communication

FACULTY OF FUNDAMENTAL PROBLEMS OF TECHNOLOGY

The course covers introduction to quantum information and communication combined with practical hands-on workshops in the National Laboratory of Quantum Technologies (NLQT). Foundations of quantum mechanics will be explained to students without background in physics to give grasp of basic concepts. Interact with state-of-the-art research equipment for quantum communication and quantum entanglement generation with applications such as quantum teleportation and quantum super dense coding! Discuss quantum information in formal measures upon qubit definition. Investigate quantum computation and communication models outlining crucial differences with classical counterparts. The course will comprise quantum circuits, algorithms and cryptographic protocols. Problems of quantum measurent, the no-cloning theorem and non-locality upon EPR paradox will be addressed. Decoherence will be signaled in regard to building universal quantum computers.

Ceramic Microfluidic Devices for Gas Sensing

FACULTY OF MICROSYSTEM ELECTRONICS AND PHOTONICS

Experience entire manufacturing process of chemical gas sensor embedded in a ceramic microfluidic device, including:

■ synthesis of gas sensitive materials (zinc oxide, tin dioxide or tungsten trioxide) ■ synthesis of dopants – metal nanoparticles (gold, silver or platinum) ■ development of pastes containing synthesised materials for screen printing ■ laser cutting of microfluidic channels in ceramic tapes ■ screen printing of gas sensitive material, electrodes and heater ■ lamination and co-firing ■ post-processing and measurement setup preparation ■ characterisation of developed structures towards selected gasses ■ data analysis and conclusions.

Laboratory activities will be supplemented with lectures regarding:

■ working principles, key parameters and modification of chemical gas sensors: resistive and electrochemical ■ basics of nanotechnology ■ manufacturing process in Low Temperature Cofired Ceramic technology ■ applications of gas sensors and ceramic microsystems.

Lab-chip Devices Assembled with Optoelectronics

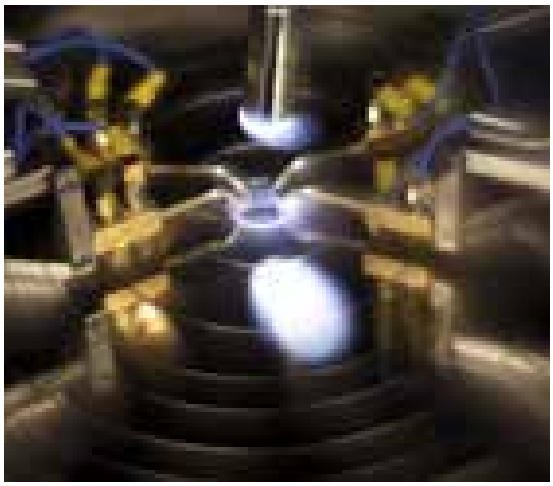
FACULTY OF MICROSYSTEM ELECTRONICS AND PHOTONICS

Take the opportunity to become an engineer of miniaturized devices using optical and electronic components! Build yourself a working on-chip device using microsystem techniques. Explore the aspects of designing, microfabrication, and testing of miniaturized devices, such as different lab-

on-chips or an electron sources, that cover various and selected aspects of a human and animal health monitoring. Beside our expertise knowledge, we offer to supervise your laboratory work: 1) to construct and fabricate on-chip devices, 2) to perform relevant detection methods and analysis, including spectrometry, fluorometry, scanning electron microscopy and electroluminescence!

MEMS and Mechatronic Systems with LabVIEW

FACULTY OF MICROSYSTEM ELECTRONICS AND PHOTONICS



Have you ever imagined how many miniature sensors and actuators are built in your smartphone, laptop or car? They are made utilizing MEMS (micro-electro-mechatronic systems) technology and are all linked into intelligent mechatronic systems that can measure signals and perform mechanical actions.

But how to communicate with multiple microdevices easily? How to create own mechatronic system efficiently? Use LabVIEW! It is the world's most popular graphical engineering software that enables measurements, control, data processing and testing. LabVIEW-based systems are applied in almost every branch of engineering, In this course you will learn how to use MEMS-based sensors and actuators, how to build and operate exemplary mechatronic system and, last not least, you will create your own control application with graphical user interface with LabVIEW. You do not need to be a professional programmer – everyone can learn and use LabVIEW!

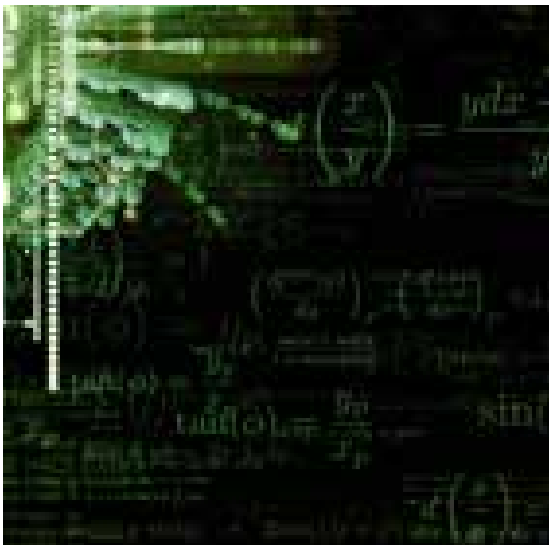
Microsystems - do you know what the MEMS are?

FACULTY OF MICROSYSTEM ELECTRONICS AND PHOTONICS

Have you ever wondered what are the sensors on a plane and how small they are? How to print a miniature clock mechanism? Or how to analyse DNA in a few minutes? This is the field of miniature devices, called micro-electro-mechanical systems (MEMS) or simply microsystems. During this course you will learn what they are, but also you will touch them and measure some of their properties. Take part in this event to see microengineering laboratory, find how microfluidic pumps are working, measure parameters of avionic sensors, discover miniature transducers for energy harvesting, analyse sample in a lab-on-a-chip, as well as design, create and measure your own mechanical microsystem using 3D inkjet printing.

Anomalous Diffusion Models with Application to Biological Data

FACULTY OF PURE AND APPLIED MATHEMATICS



Movement of the particles in a cell is a very complex dynamical process resulting from an intricate interplay of multiple components. At first sight, the trajectories of migrating particles resemble those of thermally driven Brownian particles. However, by analyzing

the trajectories of various particles, one can empirically show that anomalous dynamics characterizes such movements. In fact, the characteristic properties of such anomalous diffusion can indicate differences between types of particles. Often, it is even possible to detect the presence of some extracellular component, e.g. a medication. To describe such anomalous dynamics, or the, so called, anomalous diffusion, one can use many different types of stochastic processes. Get an insight into mathematical and applicational background in this topic. Learn how to simulate considered models, estimate their properties and fit these models to real biological systems.

Introduction to Data Science with Python

FACULTY OF PURE AND APPLIED MATHEMATICS

According to CareerCast, Data Scientist is one of the best job of recent years. It requires a unique blend of skills from three disciplines: mathematics (especially statistics), computer science (especially data analysis) and domain knowledge (in the field it will be applied), which is very attractive to many employers. Strong computer science skills and different approach to data analysis, based on scientific method, is what makes Data Scientists different from statisticians. At the same time, Python is becoming a language of choice for many data scientists, next to languages like Scala and statistical packages like R. It is also the first programming language many people learn, no matter their age. This course gives you a chance to quickly build up your Python skills, learn basics of how data scientist works and apply all this to a project on a real, large data sets. This course is highly practical.

Energy Excellence Excitement

BE A PART OF AN UNFORGETTABLE EXPERIENCE AT ONE OF THE BEST TECHNICAL UNIVERSITIES IN POLAND - WROCLAW UNIVERSITY OF SCIENCE AND TECHNOLOGY! JOIN US FOR A SUMMER OF 3E+!

Feel free to contact us at : **events@pwr.edu.pl**

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