Summer & Winter Schools at RWTH Aachen University

Broaden your horizon and spend your holidays abroad in Germany

Experience excellent academic content and have fun at the same time!
You develop practical ideas together with renowned professors and expand your skills with hands-on case studies. Enjoy a wide range of social events in an unforgettable time, full of cultural and fun activities. Every program includes accommodation, two meals per day, and personal support from local mentors.

Highlights & Benefits

To support the academic content of each program, we include visits of companies and institutes, lab tours, and the chance to network with German companies and organizations.

Find all Short Courses on our website

Excellent Academic Teaching

RWTH Aachen University is top-ranked and one of Europe's leading science and research institutions. You benefit from high-value academic content in excellent classes.

Lectures and Exercises
- Q&As
- discussions & debates
- interactive participation

support by our lecturers

Case Studies and Experiments
- simulation games
- competitions & group work
- lab work

learning by doing

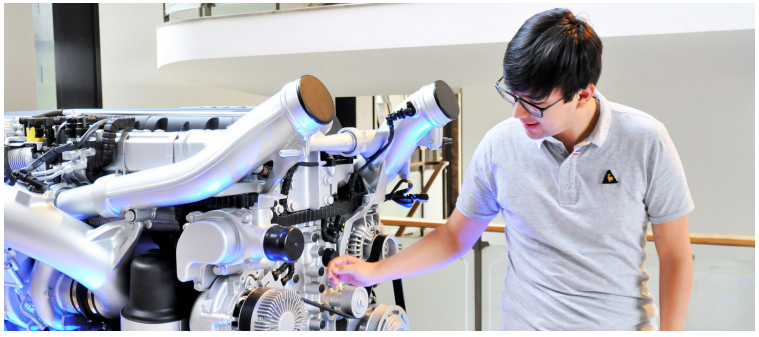
Supporting Program & Intercultural Experience

Our attractive supporting program provides an insight into the history and culture of Germany. Expand your network with international students, professors and industry partners, be part of a global community and meet friends from all over the world.

- city rally to explore Aachen
- trips to Maastricht, Cologne or Bonnn
- hiking tour to the Border Triangle
- intercultural meet-ups, barbeque with mentors
- karaoke or game night
- honoring events: welcome and certificate ceremony

Quickfacts about our Courses

- **Study format: Short Course**
- **Teaching: on campus**
- **Duration: 2-4 weeks**
- **Workload: 50-120 Teaching Hours**
- **Credit Points: 2-4 ECTS**
- **Qualification: RWTH Certificate**
- **Language: English**



Application Information
You are welcome to apply if you:

- are at least 18 years old
- pursue your higher education
- completed your 1st/2nd year of studies
- study a degree related to our program
- are proficient in the English language

course-specific requirements on program pages

Contact:
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Photos: RWTH International Academy, Adobe Stock

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Automation and Simulation

Sign up for this course until April 1, 2022

Expect these Contents

You learn all about fundamentals in automation and simulation. The topic simulation features various exercises in a computer lab. You solve real world problems by applying software and acquire a solid understanding of methods used in mechanical engineering.

During a lab tour, you gain an insight into the institute's research approaches. In the automation part, you discuss modern automated production systems, covering all the major cutting-edge technologies of production automation.

Solve computing assignments and apply your skills in a project

- Come up with elaborate calculations for adequate simulations
- Realize a project work in a computer laboratory
- Try, test, and acquire methods in mechanical engineering to understand automation processes
- Learn about current research challenges during a lab tour
- Upgrade your skill set for the interdisciplinary engineering world

Time Frame and Credits

- On Campus: July 11 - 29, 2022
- Effort: about 90 hours
- Credit Points: 3 ECTS
- Course fees: 2,990 €

Interactive Teaching

- Mathematics for simulation
- Simulation exercises
- Project work with simulations
- Methods in mechanical engineering for automation processes
- Automation in production systems

Desirable is basic knowledge in the following areas: Mathematics, Mechanics, Materials Science, Thermodynamics, Computer Science/Programming Techniques, Machine Drawing/Modelling

Your Academic Staff

The Institute of General Mechanics (IAM) and a visiting scholar with whom the institute has been cooperating successfully for many years are responsible for the academic content. The simulation part covers two weeks of lectures and project work. The automation part lasts one week and provides a comprehensive overview of the subject.

Photos: RWTH International Academy, Martin Braun

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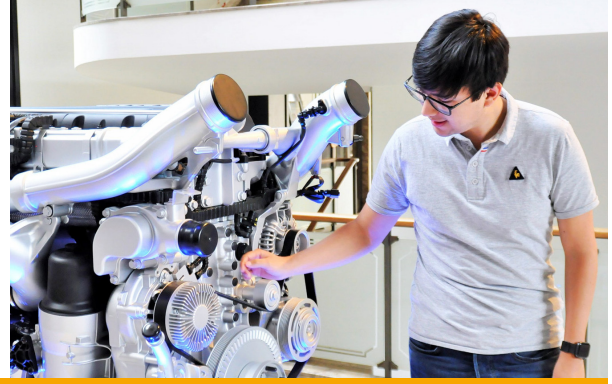

Automotive and Mobility Studies

Sign up for this course until April 1, 2022

Expect these Contents

You get the chance to explore the fundamentals of automotive engineering, learn about mobile propulsion, and understand modern automotive technologies.

On the one hand, you debate alternative and electrified vehicle propulsion systems. On the other hand, you examine automated driving and work on a case study. You even get to meet a student formula team. They present their work on self-built race cars with alternative propulsion systems to you.

Build the best self-driving miniature car and win the competition

- Study modern automotive technologies and longitudinal dynamics and see how driving resistances and brake systems work
- Apply your knowledge on energy conversion: Test various karts with different engines on a racetrack
- Consider automated driving in its legal, social and economic context and see how a student racing team builds their cars
- Succeed in a case study by building a self-driving miniature car

Time Frame and Credits

- **On Campus: June 13 - July 08, 2022**
- **Effort: about 120 hours**
- **Credit Points: 4 ECTS**
- **Course fees: 3,750 €**

Your Academic Staff

The Institute for Automotive Engineering (ika) and the Chair of Thermodynamics of Mobile Energy Conversion Systems (tme) conduct the academic content.
Research areas include innovative concepts for components and systems, vehicle prototypes, the development of innovative components, controls and system concepts in traction and automotive technologies.

Interactive Teaching

- Automotive engineering
- Alternative and electrified vehicle propulsion systems (AVPS)
- Automated driving
- Mobile propulsion fundamentals
- Student racing team

Desirable is basic knowledge in the following areas: Mathematics, Mechanics, Physics, Fluids, Energy Conversion Machines, Thermodynamics, or Automotive Engineering.

Photos: RWTH International Academy, Adobe Stock, Institute for Automotive Engineering (ika)

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Energy Performance of Buildings & Districts

Sign up for this course until April 1, 2022

Expect these Contents

You explore the energy efficiency of buildings on a micro-level, and consider districts on a macro-level. You learn about building performance simulation and methods for energy supply of buildings. Dive deeper into energy trading and power plant management.

You master the fundamentals of modeling and simulation to carry out dynamic building simulations. Apply your knowledge in a practical manner: Work on a case study featuring energy efficient technology. Succeed in a business simulation game on energy trading and power plant management.

Simulate a campus building and optimize its energy performance

- Understand the mathematical and physical basics to work with dynamic building simulation and plant operation simulations
- Implement models using computer-based numerical methods and the object-oriented modeling language Modelica
- Work with heat generation methods of renewable energy sources and the topic of electricity trading
- Acquire a micro- and macro level understanding

Time Frame and Credits

- **On Campus: July 18 - 29, 2022**
- **Effort: about 60 hours**
- **Credit Points: 2 ECTS**
- **Course fees: 1,990 €**

Interactive Teaching

- Building performance simulation
- Energy basics and methods for energy supply of buildings and districts
- Project work: the campus cube
- Energy management and trading
- Fuel cells and energy storage

Desirable is basic understanding of power generation and power systems, electrochemical systems or electricity systems and its components.

Your Academic Staff

The academic content of this Summer School is led by the Institute of Energy Efficiency and Sustainable Building of RWTH Aachen University and is supported by two visiting professors of TH Bingen. Renewable Energy Industry is an important research area.
A Research Scientist at Jülich Research Centre (FZJ) provides content on fuel cells and energy storage.

Photos: RWTH International Academy, Martin Braun

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European Studies

Sign up for this course until April 1, 2022

Expect these Contents

You learn a lot about the economic, legal and political dimensions of the European Union. After an introduction of EU-history and -institutions, you debate current political questions. While you defend your perspective in a EU-role play, you become aware of the difficulties in decision-making processes.

Together we visit the European Parliament in Brussels and you get the chance to talk to its members!

Represent a Euorpean country in a role play to discuss current issues

- Comprehend the European Union's structure and discuss urgent challenges like climate risks and digital transformation
- Gain first-hand knowledge about the European legal system from an insider who works at the European Parliament
- Apply your knowledge in a role play: „Welcome to Europe"
- Experience where parliament members decide about politics during a guided visit of the European Parliament in Brussels

Time Frame and Credits

- **On Campus: July 25 - Aug 12, 2022**
- **Effort: about 90 hours**
- **Credit Points: 3 ECTS**
- **Course fees: 2,990 €**

Your Academic Staff

This course is conducted by the Department of International Economics at RWTH Aachen University. For the content on EU's legal system, we work with a jurist for European and international law. He is a political adviser for a parliamentary party and works at the European Parliament in Brussels. The RWTH Institute for Political Science contributes topics related to international relations.

Interactive Teaching

- EU history and institutions
- Economics in the European Union
- European legal system
- Sustainable climate policy
- Principles of digitalization and transformation

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German Engineering, Language and Culture

Sign up for this course until May 1, 2022

Expect these Contents

This Summer School provides you with an introduction to German engineering and natural sciences as well as German language and culture. Topics include fundamentals of biology, chemistry and physics, but also contemporary issues regarding sustainable mobility concepts, Industry 4.0 and bioprocess technology.

The course is especially tailored to students from Keio University, Japan, but open for all students studying at a Japanese partner university or at a university of the ASPIRE League.

Explore Germany's scientific work together with your mentor

- Study the German language and learn about pronunciation, grammar as well as fun facts regarding German culture
- Understand sustainable mobility concepts and gain insights into big data and the internet of production
- Visit the „Smart Automation Lab" to see robots in action
- Conduct measurements and optimize experiments with your teammates in various labs and win a competition

Time Frame and Credits

- **On Campus: Aug 22 - Sept 09, 2022**
- **Effort: about 90 hours**
- **Credit Points: 3 ECTS**
- **Course fees: 3,750 €**

Your Academic Staff

The teaching is divided into three parts: a natural sciences part, engineering topics, and a German language part. The language classes are conducted by the Language Center of RWTH Aachen University. Numerous institutes are responsible for the academic program, allowing students to explore these interdisciplinary fields of study.

Interactive Teaching

- German language course
- Natural sciences
- Sustainable mobility concepts
- Bioprocess technology
- Industry 4.0

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Production Technology meets Industry 4.0

Sign up for this course until May 1, 2022

Expect these Contents

The Summer School provides students with an overview of RWTH Aachen's research concerning Industry 4.0 and is headed by the Cluster of Excellence "Internet of Production". Currently important research topics are discussed from 15 different viewpoints.

Aside from boosting your career, our Summer Schools provide you with an unforgettable opportunity for intercultural exchange. Gain insights into student life at RWTH Aachen University and network with German companies and organizations!

Optimize production by considering materials, AI and smart factory concepts

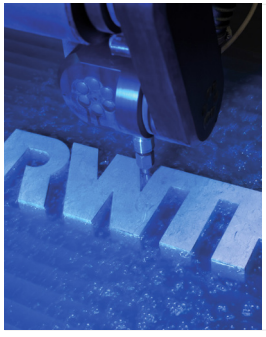
- Experience the production chain with real-life machines
- Learn how to plan the layout of modern factories
- Gain valuable insights into Industry 4.0 technologies to improve human-machine interaction and succeed in future work places
- Understand artificial intelligene, big data and data mining
- Visit the „Smart Automation Lab" to see robots in action
- Work with various materials and lightweight design

Time Frame and Credits

- On Campus: Aug 01 - 19, 2022
- Effort: about 90 hours
- Credit Points: 3 ECTS
- Course fees: 2,990 €

Your Academic Staff

The lectures and exercises of this Summer School are conducted by the Cluster of Excellence „Internet of Production" and numerous institutes of RWTH Aachen University. Supporting institutes include the WZL, Cybernetics Lab, IBF, IKV, DAP, IGMR, IAW, IEHK and ITA, making this our most interdisciplinary and diverse program.



Interactive Teaching

- Internet of Production, Internet of Things
- Automation and Robotics
- Smart Factory
- IT: CPS, IoT, Data Visualization and Mining
- Artificial Intelligence
- Materials Science
- Smart Decision Support

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Robotics, Communication Networks and Innovation

Sign up for this course until April 1, 2022

Expect these Contents

In this Summer School, you get to program a robot education cell in a team and make your robot compete! Master the main areas of robotics: robotic systems, kinematics and dynamics.

Study the history of information theory, understand challenges and focus on practical examples of solving problems in modern communication technology. Plus, you learn about mechatronics and how to change or add an element in order to ease innovation processes.

Build a robot with your teammates and win our contest

- Come up with innovative changes to a real-life mechatronic systemy by considering its fragmentation and functions
- Programm a robot education cell and its sensors with Java
- Learn about the components and applications of robotic systems from industrial robots to lightweight robots
- See application examples of information theory and communication technology like power control in wireless networks

Time Frame and Credits

- **On Campus: July 04 - 22, 2022**
- **Effort: about 90 hours**
- **Credit Points: 3 ECTS**
- **Course fees: 2,990 €**

Interactive Teaching

- Introduction to robotics
- Robotic systems and kinematics
- Fundamentals of mechatronic system engineering
- Information theory and systematic design of communication systems

Desirable is basic knowledge in technical mechanics, automation technology, robotics, mechatronics or computer science.

Your Academic Staff

The Institute of Mechanism Theory, Machine Dynamics and Robotics (IGMR), the research group ISEK and the RoboScope as part of the Institute for Information Management in Mechanical Engineering (IMA) conduct the academic content. Research areas include mechanism theory and kinematics, machine dynamics and vibration technology, robotics and mechatronics, and information theory and communication systems.

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Robotics for Future Industrial Applications

Sign up for this course until May 1, 2022

Expect these Contents

This Summer School is all about engineering, controlling and programming of robots. First you gain fundamental theoretical knowledge in robotics and then apply your skills in lab classes at RWTH Aachen University. You solve classical problems in robotics like localization and navigation and use simulations.

Programming, path planning, trajectory planning, mapping and object manipulation are part of this program. Receive information on industrial applications and see how stationary and mobile robots move because of your programming.

Learn how to program robots for multiple purposes

- Experience various types of stationary and mobile robots
- Gain a theoretical understanding of lightweight industrial robots
- Apply your knowledge in practical projects and exercises
- Make use of different types of programming software and learn about sensors and their inaccuracy
- Solve tasks like mapping, navigation, planning, and reasoning

Time Frame and Credits

- On Campus: Aug 01 - 19, 2022
- Effort: about 90 hours
- Credit Points: 3 ECTS
- Course fees: 2,990 €

Interactive Teaching

- Challenges in mobile robotics & Monte-Carlo localization
- Mapping and path planning
- Planning with PDDL
- Goal reasoning with CLIPS
- Fundamental subjects in industrial robotics and related mechatronic systems

Desirable is basic knowledge in the following areas: Lecture „Artificial Intelligence“ (or objective evidence of equivalent knowledge), programming skills (C++ and/or Java) or interest in logic-based programming. Linux skills are beneficial.

Your Academic Staff

The academic content has been designed by the Institute of Mechanism Theory, Machine Dynamics and Robotics (IGMR) and the Knowledge-Based System Group (KSBG) of RWTH Aachen University. IGMR‘s research areas include mechanism theory, kinematics, machine dynamics, vibration technology, and robotics. The KBSG focuses on topics of knowledge representation, artificial intelligence, and cognitive robotics.

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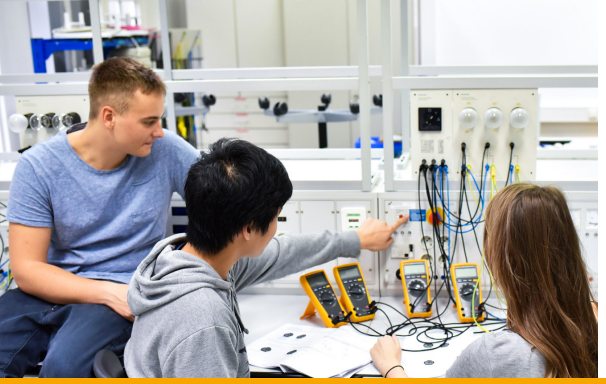
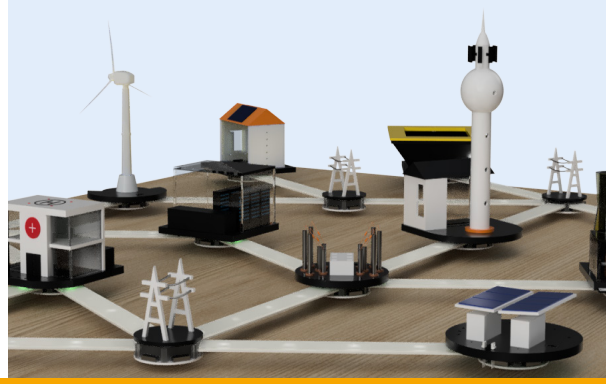




Smart Electrical Power Systems

Sign up for this course until April 1, 2022

Expect these Contents

In this program, you master current challenges and new technologies with regard to future electric grids, renewables and Smart Electrical Power Systems. You learn about measurement techniques and distributed intelligence for power systems. Synchronized measurements including sensors and instruments are an important subject.

Discuss the future of electrical grids and microgrids, and discover real time simulations of power systems. You achieve a thorough understanding of the key challenges of future power systems.

Use measurements and monitoring for laboratory exercises

- Understand the role of measurements and monitoring
- Learn new measurement requirements and technologies
- See how renewables change key concepts of power systems
- Master the theoretical implementation of a microgrid
- Make use of real time simulation in laboratory exercises
- Experience power system dynamics in a computer simulation

Time Frame and Credits

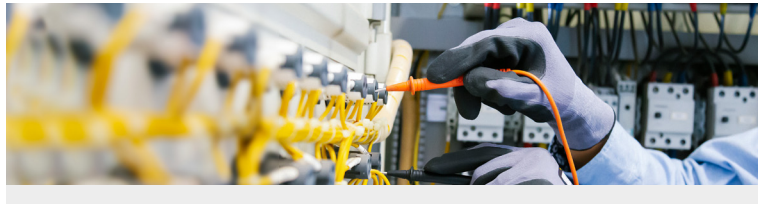
- **On Campus: July 04 - 15, 2022**
- **Effort: about 60 hours**
- **Credit Points: 2 ECTS**
- **Course fees: 1,990 €**

Your Academic Staff

RWTH Aachen University's E.ON Energy Research Center is responsible for the academic content. Two divisions of E.ON ERC conduct the lectures: Automation of Complex Power Systems, and also Power Generation and Storage Systems. Plus, the Institute for High Voltage Equipment and Grids, Digitalization and Power Economics supports the teaching.

Interactive Teaching

- Measurement techniques and distributed intelligence for power systems
- Electrical grids today and tomorrow
- Real Time Simulation, power system dynamics and microgrids
- Key challenges of future power systems



Desirable is basic understanding of power generation and power systems, electrochemical systems or electricity systems and its components.

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Supply Chain Management and Logistics

Sign up for this course until April 1, 2022

Expect these Contents

In this Summer School, you explore innovative supply chain management concepts: Master the fundamentals of supply chain management and apply them in a business simulation game.

Study the digitalization of supply chains and its potentials in theoretical as well as game-based lectures. In a case study with real but fun examples, you become aware of the important challenges in logistics.

Have fun in a role play that simulates a real-world supply chain

- Experience the production chain with real-life machines
- Learn how to effectively align customer demand and supply
- Consider various industry sectors and countries
- Make decisions in sales, operations, supply chain and purchasing to develop a business strategy with your team members
- Grasp the supply chains‘ digitalization in game-based classes

Time Frame and Credits

- **On Campus: June 20 - July 1, 2022**
- **Effort: about 60 hours**
- **Credit Points: 2 ECTS**
- **Course fees: 1,990 €**

Interactive Teaching

- Main principles of the supply chain
- Mastering the business simulation game
- Trends and impacts on future supply chains
- Supply chain digitalization

Your Academic Staff

The Summer School is jointly conducted by the Institute for Industrial Management (FIR) at RWTH Aachen University and a visiting scholar and supply chain management expert from the Netherlands. FIR‘s research areas are service management, information management, production management and business transformation.

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