Railway Systems Engineering
Transport Engineering and Mobility, M. Sc.
Designing Future

Course of Studies

How can innovative ideas in vehicle construction enable new transport concepts? How can transport networks be logically developed, expanded, relieved, and ecologically planned? How can factors like rolling stock and routing be managed in a way that need-oriented and smooth railway traffic is possible? How do random disturbances in transportation have to be considered in order to avoid jamming or to optimize safety strategies? How can we shift more passenger and freight transport to the rails? Is driverless operation possible for all kinds of rail transport means? When the interaction of technical possibilities, infrastructure, and human behavior is supposed to be optimized, transport engineers are called upon for their interdisciplinary perspective.

At RWTH Aachen University, students of the Mobility and Transport program acquire this interdisciplinary expertise by studying the perspectives of three engineering disciplines: civil engineering, mechanical engineering, and electrical engineering. This extraordinary breadth allows them to consider not only the aspects of infrastructure development and rail vehicle engineering but also the economic framework conditions of their concepts.

Take advantage of the opportunity to expand and refine your expertise within the process of designing the ever-present desire of people to be mobile.

The focus Railway Systems Engineering concentrates on the further development of railway engineering. Students work with rail vehicles, rail transportation systems, and infrastructure developments in rail transportation. This master’s program covers each aspect of the complete system „Railway“, the infrastructure, the operation and the vehicles including the electrical drive as well as electric power supply. Furthermore, this is the only focus of the Master degree program Transport Engineering and Mobility which can be studied completely in English.

Studying at the RWTH Aachen

The RWTH Aachen University is one of the largest and one of the best renowned universities in Germany. Due to its large student population, Aachen is a young and dynamic city offering many leisure activities which is located near the border to the Netherlands and Belgium.

In addition, Germany is one of the few countries where courses are exempt from tuition fees, though there is a semester fee for organisational matters and the semester ticket for the whole public transport in North Rhine-Westphalia.
The Research Center Railways who organizes the RSE-Master program is a cooperation between three institutes from three different faculties.

**Institute of Transportation Science and Chair of Railway Engineering and Transport Economics (VIA)**

This institute is a part of the Faculty of Civil Engineering. The lectures from VIA focus on the fundamentals of railway construction such as track construction, alignment, stations and switches as well as railway operation. This includes dimensioning the infrastructure, productions systems, signaling and safety systems and operation of urban transportation systems. This way, our students obtain a broad knowledge about planning, operating and maintaining a railway network.

Another task of this institute is transportation economics (Transport Management, Intermodal Transport and Logistics).

[www.via.rwth-aachen.de](http://www.via.rwth-aachen.de)

**Chair and Institute for Power Electronics and Electrical Drives (ISEA)**

The ISEA is part of the Faculty of Electrical Engineering and Information Technology. The institute consists of the Chair for Power Electronics and Electrical Drivers and the Chair for Electrochemical Power Conversion and Battery Storage. The field of research of ISEA is on power electronics, electrical drives and batteries. At ISEA, students can participate in research activities of all relevant electric drive components for electro-mobility, regardless of the application.

[www.isea.rwth-aachen.de](http://www.isea.rwth-aachen.de)

**Chair and Institute of Rail Vehicles and Transport Systems (IFS)**

As a member of the Faculty of Mechanical Engineering, the IFS is responsible for research and teaching in the field of railway rolling stock. The IFS investigates and develops methods, processes and products that improve the attractiveness and competitiveness of the railway system, including the interfaces with other means of transport.

The rail vehicle is placed in the center of the research activities at the IFS, closely integrated in the overall railway system and with logistic connections with other transport systems.

[www.ifis.rwth-aachen.de](http://www.ifis.rwth-aachen.de)
Prerequisites

One of the prerequisites for getting accepted to this master program is a first university degree, with which the necessary engineering background education can be proven, as outlined in the exam regulations. The students should have completed 18 ECTS CP in mathematics/statistics (at least 14 ECTS CP in mathematics and 2 ECTS CP in statistics), and 11 ECTS CP in mechanics. Furthermore, they have to prove knowledge equivalent to at least 10 ECTS CP in at least two of the topics construction material science, geotechnology, environmental management, hydromechanics, thermodynamics or electrical engineering. Subject-specific knowledge worth 50 ECTS CP is required.

10 ECTS CP each from this subject-specific knowledge has to have been acquired in two of the following fields: transportation science, mechanical engineering, electrical engineering, construction engineering, urban planning and computer science. In addition, a profound level of the English language is required. For this focus a level corresponding to the level B2 of the Common European Framework of Reference for Languages (CEFR) is necessary.

Non-EU-citizens need to apply for a visa for their stay and have to send their application for the degree programme by March 1st. EU-citizens need to send an application by July 15th.

Exemplary study plan

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<td>• Power Electronics - Fundamentals, Topologies and Analysis</td>
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Studying with perspective

Industry contacts

Mobility is the global motor for economic development and personal evolution. International experience for budding transport engineers is becoming increasingly important and is often a deciding factor for one's career path. This program offers a great opportunity for young engineers of diverse backgrounds to learn, study and work together in an international environment. German universities are well known for working closely with the industry on cutting edge topics, thereby rendering their research not only relevant to the needs of the current times, but also fostering a fruitful environment of mutual development. Each of the organizing institutes has outstanding contacts to companies in and outside of Germany. The involved faculties are members of many different research associations as well. All these factors help generate chances for interesting and highly instructive internships for the students.

Career Prospects

Engineers with expertise in mobility and transport are multidisciplinarily trained professionals, who are able to optimize the interaction of transport carriers and transport infrastructure with regards to technical, economic, and social aspects. Among the many positions held by RWTH graduates of such master courses are, for instance, optimizing transport processes in public administration, where they support the entire organization – from the political decision to budgeting continuing to the operation of transport systems. On another level, many employment possibilities exist directly in the railway industry, for example working for manufacturers for rolling stock or signaling systems. Our graduates also work in consulting and engineering offices which offer support and solutions to the original equipment manufacturers. Furthermore, transport companies which operate the rail networks across the world as well and the logistics sector both face very challenging tasks of an interdisciplinary nature which are ideal areas of application from the perspective of a mobility specialist. Finally, a very important and interesting opportunity is to continue one’s career in the university as a doctoral candidate. Doctoral studies in the engineering field in Germany offer you the chance to work on open questions in the railway sector, in close cooperation with the aforementioned industries.
At a glance

More Information on www.rwth-aachen.de/go/id/bmyq

Contacts

Information on subject-specific details
Academic Program Coordinator
move@fb3.rwth-aachen.de

Information from student’s perspective
Student council of the Faculty of Civil Engineering
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www.fs-bau.rwth-aachen.de

Information on studying and internships abroad
International Office at the Faculty of Civil Engineering
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Information for foreign students
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