

# **FACULTY OF TRANSPORTATION SCIENCES**

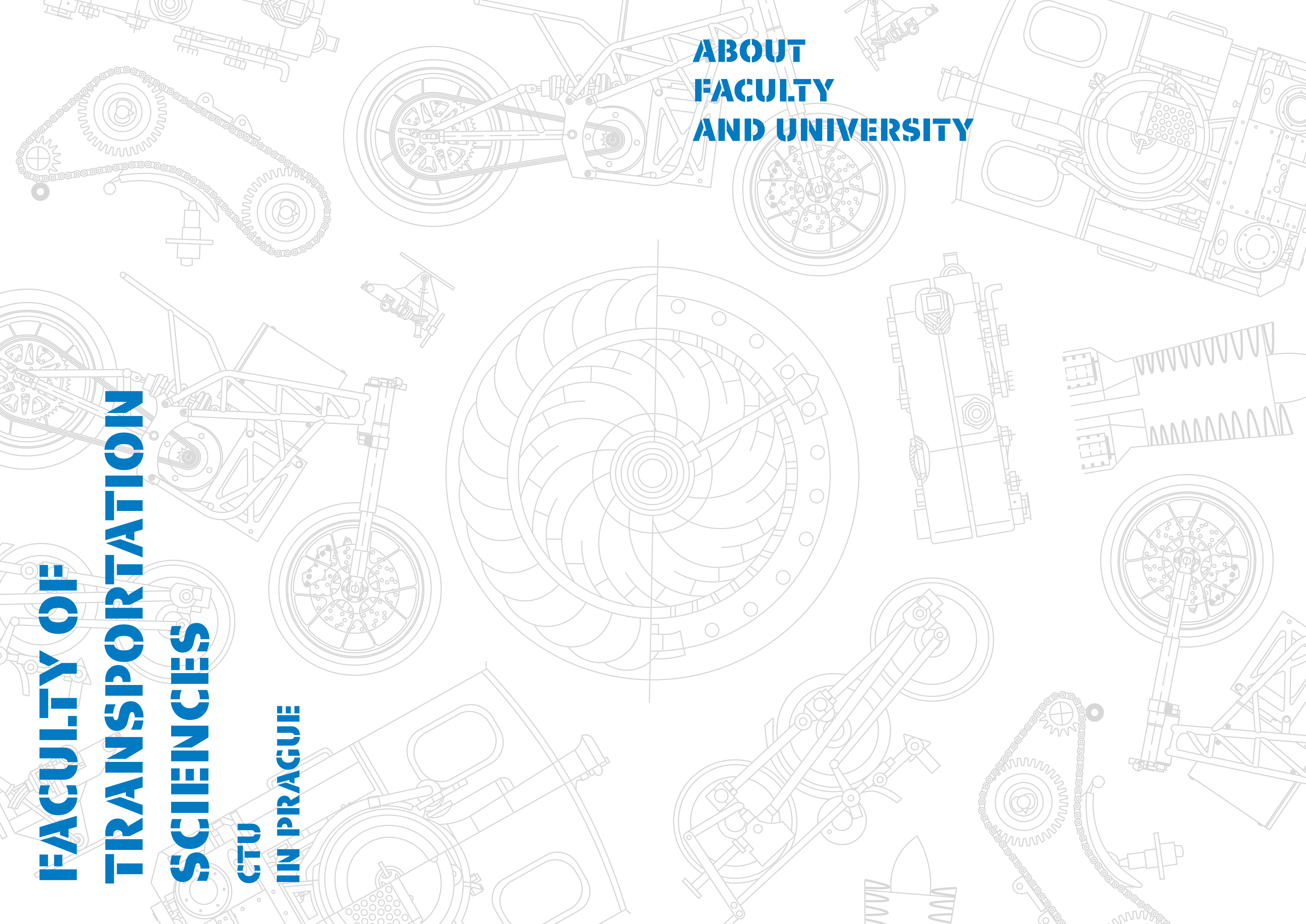
**CTU  
IN PRAGUE**



# FACULTY OF TRANSPORTATION SCIENCES

CTU  
IN PRAGUE

ABOUT  
FACULTY  
AND UNIVERSITY





## ABOUT FACULTY OF TRANSPORTATION SCIENCES

By founding the Faculty of Transportation Sciences (FTS) the management of the Czech Technical University in Prague expressed their determination to keep up with the world's leading universities and to include the development of technologies and engineering into their scientific and educational objectives. In addition, they also focus on the development of fields of study which owing to engineering methods exceed wide areas of human activities together with their system organization in terms of time and space. Such an approach is required by the current process of globalization of world telecommunications and transportation systems; in practice, this is manifested, for instance, by an improved service planning diagrams for railway transportation or by system construction of combined transportation with respect to environmental consequences.



## ABOUT CZECH TECHNICAL UNIVERSITY

The Faculty of Transportation Sciences is one of eight faculties of the Czech Technical University in Prague, which is one of the biggest and oldest technical universities in Europe. The CTU was founded on 18 January 1707 by the Emperor Joseph I on the initiative of Christian Joseph Willenberg, the recognized expert in fortification works who was appointed a professor by the Czech Estates Decree dated 9 November 1717. Teaching at this first school of engineering in Central Europe began in January 1718 and it was named the Estates School of Engineering in Prague. It was not until 30 years later when the renowned and still existing Parisian university École Nationale des Ponts et Chaussées was established.

CTU currently has eight faculties (Civil Engineering, Mechanical Engineering, Electrical Engineering, Nuclear Science and Physical Engineering, Architecture, Transportation Sciences, Biomedical Engineering, Information Technology) and about 16,000 students.

For the 2018/19 academic year, CTU in Prague is offering its students 169 study programmes within the framework of which there are 480 fields of study. CTU educates modern specialists, scientists and managers with knowledge of foreign languages, who are dynamic, flexible and can adapt quickly to the requirements of the market.

## WE ARE UNIQUE IN THE CZECH REPUBLIC

- in having adopted a specific form of project-oriented education.
- in having set up several unique scientific research facilities since 1993, where we have been providing project education closely linked with practice and collaborating on solving current problems in the field of transportation.

## WE ARE UNIQUE IN THE WORLD

- in offering a coherent education programme in intelligent transportation systems (ITS). This programme is closely linked with practical applications, and is aimed not only at Czech students but also at foreign students. The programme is taught only in English. Foreign students taking this programme can study at famous universities abroad
- (Fachhochschule Technikum Wien, Austria and Linköping University, Sweden).
- in educating students who participate actively in the successful running of the MEPS international student transport engineering seminar, which has been taking place for 15 years. MEPS rotates around towns in the Czech Republic, Hungary and Austria. In mixed groups, participants propose new solutions to transport problems in the host towns.

## WE ARE PREPARING FOR THE NEAR FUTURE

- equipping the Systems Geoinformatics Laboratory with instrumentation.
- a new faculty classroom for CAD/GIS/Cax systems and transport modelling.
- the introduction of a new model for an overall study programme structure that will ensure high-quality graduates with excellent prospects on the employment market.
- the new Vehicle Drives laboratory.
- the laboratory for physics and diagnostics of surface layer materials.

## WE ARE MEMBERS OF THE

- European Rail Research Network of Excellence – EURNEX
- European Rail Research Advisory Council – ERRAC
- Advisory Board of the Texas Institute of Science
- FREIGHTVIS – visions and plans for European freight traffic until 2050
- E-FRAME – extended FRAME architecture for the development of cooperative systems
- European Platform of Transport Sciences – EPTS (in 2013, the Dean of the Faculty is the president of the platform)

## WE ARE PROUD OF

- The dominant position we have gained in the field of university education in transportation studies, which had been offered only in Žilina (Slovakia) before Czechoslovakia was split into the Czech and Slovak Republics.
- The high percentage of success in applying for grants and carrying out funded projects, reflecting the high level of professionalism of the projects undertaken at the faculty.
- The stabilization of the academic life at our faculty, which celebrated its 20th anniversary in 2013. Our graduates participate in major national and international projects and hold important positions, in the private sector and also in the state sector.







# STUDY AT FACULTY OF TRANSPORTATION SCIENCES

The Faculty of Transportation Sciences offers programmes for Bachelor's degrees, Master's degrees and Doctorate studies focused on transportation and telecommunications. Fields of studies are focused on:

- Transportation Systems and Technology
- Management and Economics of Transportation and Telecommunications
- Automation of Transportation and Telecommunications
- Intelligent Transport Systems
- Logistics and Transport Processes Control
- Security Technologies in Transportation
- Air Traffic Control and Management

Bachelor's degree and Master's degree study programmes prepare students for the future application of acquired knowledge in the fields of analyses, design, control, management, development and research related to transportation processes. The main attention is paid to the latest findings in economic theory, transportation theory, systems theory, safety and reliability of transport and telecommunication services, effects of transportation on the environment and methods for the efficient organization of logistic chains, services of new transportation technologies as well as the optimization of telecommunication processes. Amongst others things, the graduates of the Faculty's study programmes are to be readied for activities related to network operators; they are to be capable of optimizing economic relations and contributing to quality enhancement through their knowledge in the field of management and information technologies.

Ph.D. degree programmes are based on scientific and research activities of the Faculty departments and they provide thorough theoretical groundings in the following fields:

- Technology and Management in Transportation and Telecommunications
- Transportation Systems and Technology
- Air Traffic Control and Management
- Transportation Logistics
- Engineering Informatics in Transportation and Telecommunications

## INTERESTING FACT

Although the FTS one of the youngest faculties of CTU, its graduates are among the most demanded on the job market in areas related to transport, telematics and telecommunications.



## STUDY PROGRAMMES

The FTS offers Bachelor's, Master's and Doctoral degree programmes.

### BACHELOR'S DEGREE PROGRAMME

#### Technology in Transportation and Telecommunications

study fields:

- DOS - Transportation Systems and Technology
- ITS - Intelligent Transport Systems
- LED - Air Transport (taught in English language)
- LOG - Logistics and Transport Processes Control
- PIL - Professional Pilot (taught in English language)
- TUL - Technology of Aviation Maintenance

### MASTER'S DEGREE PROGRAMME

#### Technology in Transportation and Telecommunications

study fields:

- DS - Transportation Systems and Technology
- IS - Intelligent Transport Systems (taught in English language)
- LA - Logistics and Transport Processes Control
- PL - Air Traffic Control and Management (taught in English language)
- SC - Smart Cities (taught in English language)

### DOCTORAL DEGREE PROGRAMMES

#### Technology in Transportation and Telecommunications

study fields:

- T - Technology and Management in Transportation and Telecommunications (taught in English language)
- D - Transportation Systems and Technology (taught in English language)
- P - Air Traffic Control and Management (taught in English language)

#### Logistics

study field:

- L - Transportation Logistics (taught in English language)

#### Engineering Informatics

study field:

- I - Engineering Informatics of Transportation and Communication (taught in English language)

### INTERESTING FACT

Bachelor's degree programme: 1 035 students in Prague, 248 in Děčín

Master's degree programme: 471 students

Doctoral programme: 149 students

The faculty currently has 54 professors and associate professors and 133 other academics

## FACULTY DEPARTMENTS

- Department of Applied Mathematics - 16111 (K611)
- Department of Transportation Systems - 16112 (K612)
- Department of Applied Informatics in Transportation - 16114 (K614)
- Department of Languages and Humanities - 16115 (K615)
- Department of Vehicle Technology - 16116 (K616)
- Department of Logistics and Management of Transport - 16117 (K617)
- Department of Mechanics and Materials - 16118 (K618)
- Department of Transport Telematics - 16120 (K620)
- Department of Air Transport - 16121 (K621)
- Department of Forensic Experts in Transportation - 16122 (K622)
- Department of Security Technologies and Engineering - 16123 (K623)

## COMMON AND SPECIALIZED LABORATORIES

- Air Operations Laboratory K621
- Driving Simulation Research Group
- Editorial Office of Neural Network World journal
- Joint Laboratory of Biometric Identification and Localization in Transportation
- Joint Laboratory of Electron Microscopy
- Joint Laboratory of System Reliability of the FTS CTU and the Institute of Computer Science of the Academy of Sciences of the CR
- Joint Laboratory of Tunnel Systems of the FTS, University of Žilina and Eltodo a. s.
- Laboratory of Applied Mathematics in Transport and Logistics
- Laboratory for Special Projects at the Department of Security Technologies and Engineering (K623)
- Laboratory of ATM Systems K621
- Laboratory of Aviation Safety and Security K621
- Laboratory of Energy Efficiency in Transportation K616
- Laboratory of Experimental Mechanics K618
- Laboratory of Human Factor and Automation in Aviation
- Laboratory of Measuring Methods in Transportation
- Laboratory of Navigation and Identification Systems (E-IDENT)
- Laboratory of NDT (Non-destructive Testing) and Calibration of Flight Recorders K621
- Laboratory of Telematics for Smart Cities
- Laboratory of traffic management and modelling
- Laboratory of Transportation Systems Safety
- Mobile Measuring Laboratory
- Specialized Centre for Applied Simulation and Visualization
- Transport Ticketing and Information Systems Laboratory
- Transportation Hall of the Faculty of Transportation Sciences
- Vehicle Research Laboratory

## INDEPENDENT LABORATORIES

- Certification Body for Products - Faculty of Transportation Sciences (16201)
- Mobile Laboratory for Transport Analysis
- Testing Laboratory of Faculty of Transportation Sciences (16202)

## PROJECT-ORIENTED STUDY

Academic programme at the Faculty of Transportation Sciences provides its students not only with the theoretical knowledge – indispensable for the future experts, but importantly also focuses on application of this knowledge into practical life. Students are exposed to this approach from the very beginning of their studies, ensuring the interface between theory and praxis. Project-oriented study provides the future graduates with an opportunity to take part in solving practical tasks already during the course of their studies. This prepares them for the challenges they will encounter in their professional lives. Graduates with prior exposure to practical aspects of the field are better positioned to succeed on the job market. The ability to solve project-related tasks is an invaluable experience not only for managerial positions, but also for careers in the public or private sector. Work on a project gives students opportunity to acquire habits of team work, sense of responsibility for own work, as well as an appreciation of the fact that their work contributes to the overall output of the entire team. Ideally, students should work on long-term projects commissioned by external entities and in cooperation with doctoral students, academic and scientific staff. At the FTS, project-oriented study takes a form of specialized courses for all full-time students in the bachelor or master programmes, with the exception of future professional pilots and majors in Technology of Aviation Maintenance.

## STUDENT PROJECTS

The FTS cooperates on various projects. One of them is MAVEN (standing for Managing Automated Vehicles Enhances Network), which is an EU project, part of the Horizon 2020 - EU Research and Innovation Programme. The goal of MAVEN is to develop management regimes for highly-automated driving in urban areas, enabling automated vehicles to reach beyond the state-of-art of ADAS and C-ITS applications.

Another project is the Smart City Transport Solutions in which students work on their own smart transport solutions or on redesigning already existing theoretical solutions including public transport, bicycles, motorcycles, and automobiles.



### CTU LIONS

Our pride, the outstanding CTU Lions! The team of students who designed, developed, and constructed two prototypes of racing motorcycles similar to the Moto3 - electric and petrol motorbike. The team is currently preparing for their second year in the MOTOSTUDENT race.

### Electromobility

The project deals with a high range of aspects for electric and hybrid vehicles, such as power management, power installation, driving modes, telematics, charging and car-sharing, and vehicle integration in smart cities.

### Department of Air Transport

The Laboratory of the Human Factor and Automation in Aviation together with the Laboratory of Simulations in Aviation cooperate on student projects specializing in the evaluation and objectification of the human factor in aviation with the simultaneous transfer of innovations in this area to the automated control system. The projects primarily focus on the evaluation and classification of the psychophysiological status (EEG, ECG) of aviation specialists, such as pilots, air traffic controllers or aircraft maintenance technicians. Flight simulations are also underway, using the A320 flight simulator hardware and virtual reality to measure visual perception using eye tracking.

### Active and Passive Safety and Construction of Vehicles

The project deals with aspects of active and passive vehicle safety and with its construction and vehicle systems in this regard. It includes the study of legislation, vehicle dynamics, crew, and environment safety and involves students in research, design, vehicle construction, and field tests, such as test drives, crash tests, or simulations.



### Simulation and Visualization in Transport

In this project, we create visual and hardware construction for traffic research, develop visual scenes replicating the real conditions for testing and design of modern transport systems in the cities and for automotive applications - in vehicle simulators.

### HMI and Interactive Simulation for Vehicle Industry

An interdisciplinary project that deals with human-machine interaction, where our main activity is focused on developing tools for experimental research of driver-car and other human-car interaction for the automotive industry with the application of psycho-physiological assessment and driving characteristics.

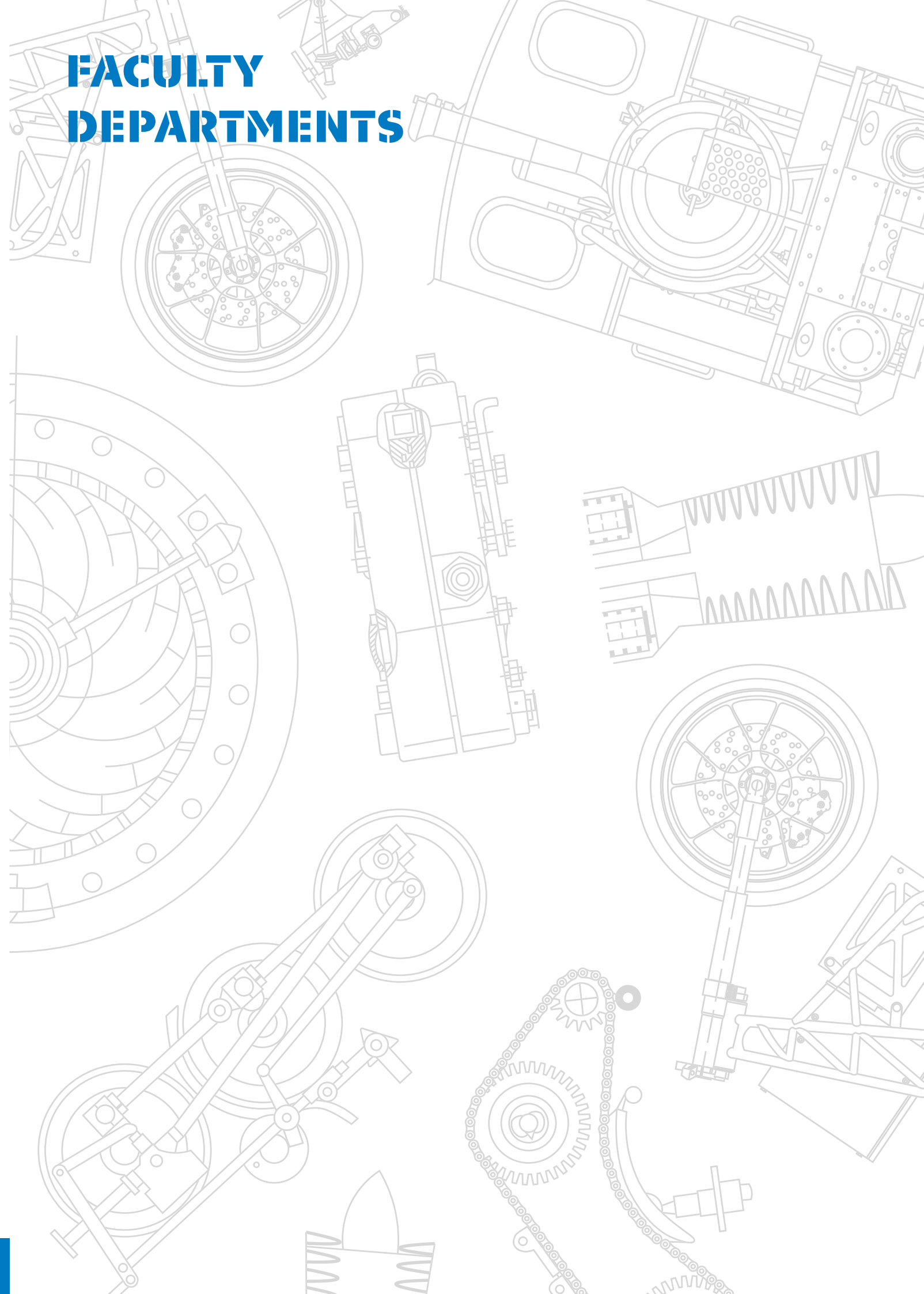
### Sustainable Mobility in Prague

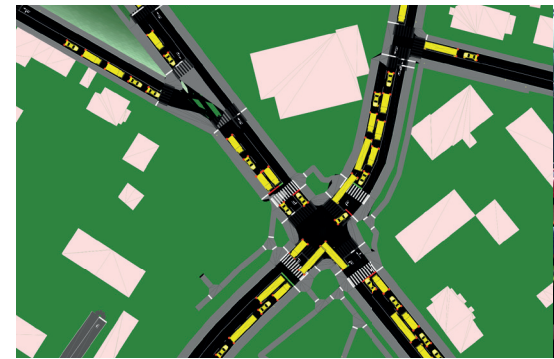
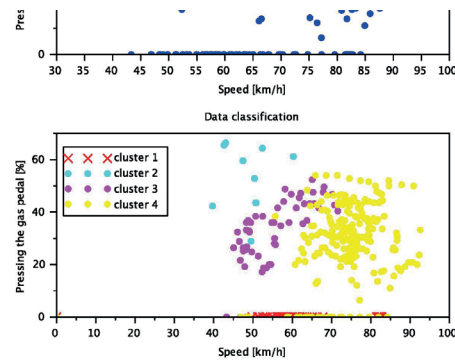
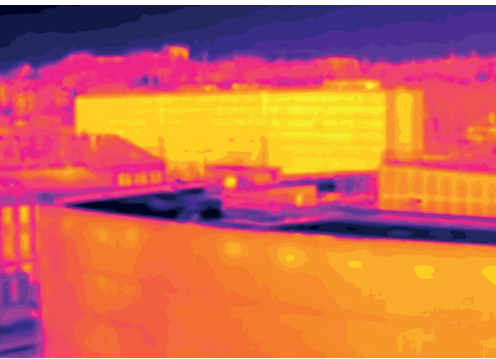
This project is focused on planning the transport system and preparing individual transport projects for implementation in the City of Prague. An efficient transport system uses all available transport modes linked to a synergistic transport network, interconnected both physically and through information systems. The preparation of analytical documents for mobility planning in Prague is also included in the project. In addition, the project focuses on the application of conceptual, strategic, and land use planning documents in the preparation of transport projects in Prague and the Prague metropolitan area. And finally, the project includes the application of, and, where needed, the extension of knowledge in the fields of urbanism, environment, participation, marketing, and project management.

The project is managed in cooperation with the Prague Institute of Planning and Development.



# FACULTY DEPARTMENTS





## DEPARTMENT OF APPLIED MATEMATICS

The department provides education in all disciplines of mathematics and physics in Bachelor and Master study programmes with special emphasis on mathematical modelling.

The department's scope of research uses the basic principles of applied mathematics and physics in the fields of transportation system modelling, thermovision measurements analysis, and approximation theory for signal processing. We are currently exploring the possibilities of utilizing artificial intelligence and transportation simulations in connection to autonomous vehicles. Our significant successes include the application of Bayesian probability statistical methods to transportation and the development of a number of algorithms for the classification of driving styles or a control of extensive transport networks.

The resulting algorithms have practical application; e.g. for traffic flow harmonisation in the southern part of Prague Ring, the queue length estimation utilising autonomous vehicles has been integrated into traffic control units to optimize intersection capacity. We collaborate for example with a company Operátor ICT (Smart Prague) and with the Office of the Government of the Czech Republic on a smart city projects. We analyse the thermovision measurements for Workswell, we provide consultation services to Škoda Auto, Ricardo, and TÜV SÜD Czech.

In the Bachelor programme, we provide instruction in basic mathematical and physics subjects. Our educational goal in the Master programme is to further students' knowledge of applied mathematics and to provide the theoretical basis of modelling linear stationary and non-stationary systems and processes. Questions of random process classification, prediction algorithms, and extensive system analysis play an important role too.

## DEPARTMENT OF TRANSPORTATION SYSTEMS

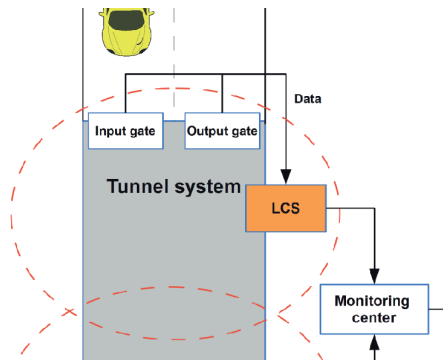
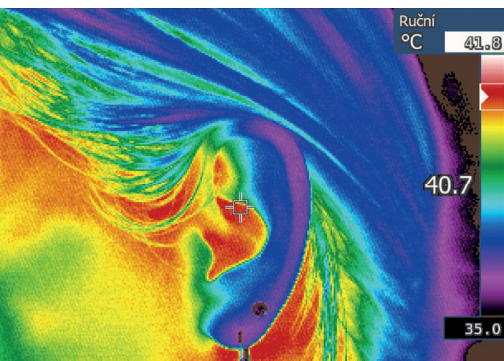
The Department of Transportation Systems is a flagship department of the study field Transportation Systems and Technology offered in the bachelor's, master's and doctoral study programmes. The various courses offered by the Department are focused on planning, design, construction, maintenance, modernization and safety of all types of transport infrastructure; transport solutions in urban and suburban regions; spatial planning; optimization of transport services within territory; traffic engineering; sustainability of transport; and environmental aspects of transport.

The Department places emphasis on a project-oriented education. The student projects lead by the Department are focusing on a wide range of traffic engineering applications. For example: planning and design of motorway network; modernization of railway network; cycling network development, traffic calming in urban areas; transport solutions in spatial planning process; development of livable residential areas and traffic safety enhancements.

The scientific and research activities of the Department are focused on optimization of transport services within selected territories including urban agglomerations; urban public transport solutions including new types of tramway constructions; integration of transport systems; modern methods of designing transport infrastructure; solving ecological issues related to planning and operation of transportation system; promotion of cycling transport; and road safety assessment and traffic accident analysis.

The Department systematically cooperates on solving of real-world problems with many governmental bodies, public organizations and private companies. The professional services offered by the Department include design, management and assessment of various types of traffic surveys; concept design and assessment of public transport within a defined territory (including assessment of vehicles and terminals in terms of passenger requirements); assessment and design of traffic calming measures and road traffic management; assessment of possible environmental impacts of transport measures and construction of transport infrastructure; measuring transportation related noise and vibrations; road safety audits and inspections; training of road safety auditors; and processing of other types of studies on transport systems (including comprehensive assessments and recommendations on optimal design selection).





## DEPARTMENT OF APPLIED INFORMATICS IN TRANSPORTATION

The department provides education in informatics and telecommunications. It also explores application of databases, artificial intelligence, biometry, and telecommunications in transportation.

The department's scope of activities is very wide: biometric identification, application of information systems for aviation and for persons with reduced mobility and orientation, datamining, genetic algorithms and genetic programming, quality assessment methods for telecommunication systems, SW safety assessment, transport simulations, automata theory and grammars.

We have successfully collaborated or still collaborate with the following entities: Ministry of Transport CR, The Road and Motorway Directorate of CR, SŽDC, AŽD Praha, The City of Prague, Brněnské komunikace, Institute of Computer Science the CAS, Kapsch Telematic Services, O2, T-Mobile, Eltodo, IMA, Pudis, Intens, Inoxive, POV, SONS, Vysoká škola regionálního rozvoje a Bankovní institut – AMBIS, CS-Soft and DERS.

Education: Algorithm Development, Database and Information Systems Design and Programming, CAD, Programming, Automation and Measurement, Telecommunications, Datamining, Safety-Critical Applications in ITS, Traffic Modelling and Simulations, Wireless Technologies, Advanced Traffic Models, AI and Expert Systems, GIS, IT projects management support.

## DEPARTMENT OF LANGUAGES AND HUMANITIES

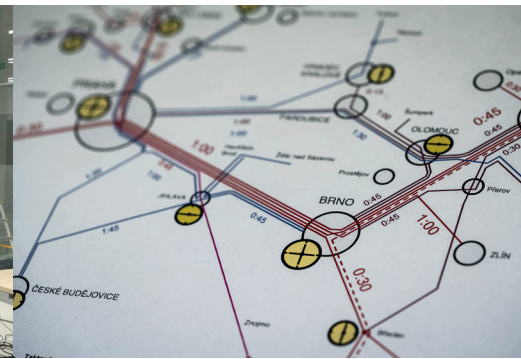
The department links technical education and humanities disciplines to develop students' language skills and further their general knowledge with respect to their future employment.

As part of project based instruction, the department announces projects which subsequently lead to Bachelor and Master theses on transport psychology and occupational safety. The department staff's professional publications are sufficiently frequent, however, due to the nature of our work, RIV points cannot be granted to the faculty.

The department is open to collaboration outside CTU, e.g. a request by Společenství autodopravců Čech a Moravy (SAČM) for a language tool that would assist international transport drivers resulted in a beautifully prepared handbook in three language mutations. The department staff also translates and proofreads documents for institutions outside CTU – Faculty of Science Charles University, The National Technical Museum, Czech Academy of Sciences, etc.

K615 provides foreign languages and humanities instruction. Current programmes comprise one foreign language in the 2nd year – English, which is compulsory, and a second language in the 3rd year concluded by a final exam. The Master programme comprises 2 languages (compulsory English) 2 hours a week each, both concluded by a final exam. Postgraduate students have to pass an English exam and acquire a credit from a second language. Humanities are either compulsory or selective.





## DEPARTMENT OF VEHICLE TECHNOLOGY

We create, devise, verify, and explore everything to do with vehicles, their construction, control, safety and most importantly inclusion in a transport system with a special focus on Human-Machine Interaction.

Today, transport technologies mean more than vehicles. They also include interconnected systems of people, machines, and information which need to be reliable, safe, efficient and sustainable. The research activities of our department focus on construction and simulations of transport technologies and the interaction with their users. In previous years the projects mainly dealing with safety and training of drivers (ASLAN, REVISED, TRESBSD) were solved; for example, a truck simulator training station was developed here (in the scope of Výprask project). The department also organizes series of the Driver – Car Interaction & Safety conferences.

Lectures taught by our department introduce the students to the theory of vehicle construction. In higher grades the lectures focus on special vehicle properties and vehicle systems simulation, design and testing, vehicle dynamics, active and passive safety, bodywork building, production technologies, vehicle operation and control. An important part of the department educational activities is presented by a CTU Lions racing team, who develop, build and race their own-designed motorcycles for an international MotoStudent competition.

We collaborate with a number of commercial partners such as Škoda-Auto, Volkswagen AG, Bosch, Porsche Engineering, Dekra, TUV and others. In cooperation with Škoda-Auto, the department runs the Automotive R&D 4.0 Laboratory under CIIRC institute, running of which is also open to students, who can acquire valuable experience with a real development work for the largest car factory in Czech Republic. In the field of driver's education, the department cooperates with Dekra in a joint of mobile truck simulator laboratory DekTruck.

## DEPARTMENT OF LOGISTICS AND TRANSPORTATION MANAGEMENT

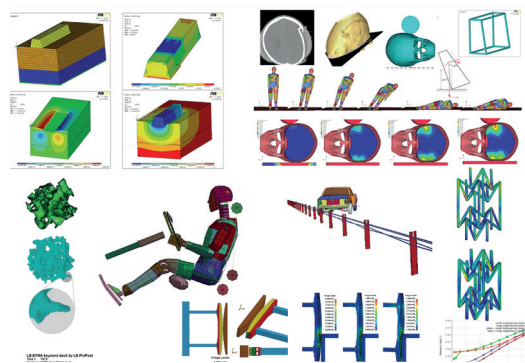
This Faculty of Transportation Sciences department specializes in and offers study programs in logistics and management of transportation linking instruction, research and application of know-how in the fields of logistics, transportation theory and technology, economics and financing of transportation, marketing and project management in transportation.

The department takes part in a number of projects supported by The Technology Centre of the CAS, the most important recent projects being: Synergy in railway lines planning, or more precisely coordination of interests of transport clients with regard to service quality standards and operational effectiveness, also Fast Connections between urban areas with regard to the impact of better accessibility on the labour market; and Czech railway system development optimisation with regard to transportation needs, or more precisely a draft of a methodology suggesting measures that would lead to an increased efficiency of the use of railway route capacity. Since 2019, the department is involved in the Smart Railway Stations project aimed at making the stations the true transportation hubs for the 21st century.

We routinely collaborate with government agencies, municipalities and regions as well as commercial entities, for example, currently we provide Pilsen, South Bohemia and Ústí nad Labem regions with expert consulting on public transport planning and provision and other related activities. Recently, we completed a parking study of the City of Prague for UBER. We participate in creation of databases and calculation applications in transportation economics. In 2018, we started a collaboration with Amazon. Last but not least, together with colleagues from the Department of Applied Mathematics we formed Laboratory of Applied Mathematics in Transportation and Logistics – LAMbDA.

We offer key courses in the Logistics and Management of Transportation Processes Bachelor and Master study program and in the new Dual Master's Degree Program Smart Cities in collaboration with The University of Texas at El Paso with whom CTU has cultivated successful collaboration for 10 years.





## DEPARTMENT OF MECHANICS AND MATERIALS

The basic and applied research in collaboration with other CTU departments (Institute of Experimental and Applied Physics), and the Institutes of Czech Academy of Sciences (Institute of Theoretical and Applied Mechanics, Institute of Thermomechanics) and leading universities (Saarland University in Saarbrücken, Technical University Dresden, Università di Bologna, University of Maribor, University of Applied Sciences in Bremen) and research institutes (Joint Research Center, Ispra, Italy and Fraunhofer Ernst-Mach-Institut, Freiburg) abroad.

The department research focuses on the area of advanced impact energy absorbing materials, auxetic and other smart structures, additive manufacturing, experimental and numerical methods with transport engineering applications. In the area of experimental mechanics the Department is well-known for its DynLab (Laboratory for dynamic testing of materials and structures) where the structures, advanced materials and impact energy absorbing constructions for transport applications are tested. Another research area is the development of experimental mechanics methods for testing materials and constructions under static and dynamic load. The department activities also include a development of special experimental devices and numerical simulations.

Commercial collaborations include shared projects and contract-based research with leading companies in the field of transport infrastructure and transport vehicles. The list of our partners includes AŽD Praha, s.r.o., Road and Motorway Directorate of CR, or Škoda Auto, a.s. (devise of new design solutions, experimental verification, static/dynamic calculations, and numerical FEM analyses).

The courses at the Department of Mechanics and Materials covers the topics of materials, construction mechanics, technical documentation and normalisation in all study programmes. The department also offers advanced courses specializing in measuring methods in mechanics, particularly methods of optical measuring of deformations, theoretical basis of numerical methods (Finite Element Method) and their applications in engineering simulations.

## DEPARTMENT OF TRANSPORT TELEMATICS

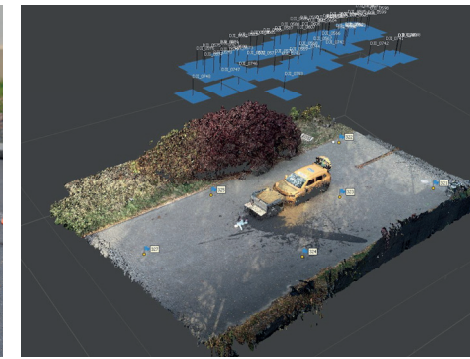
The department specializes in transport telematics, systems sciences and other connected fields which form the basis of its research as well as educational activities. As example of typical telematic issues the department focuses one can name traffic control systems, passenger ticketing and information systems, geographical information systems, identification and navigation systems, railway interlocking systems, cooperative systems, telematic systems architectures and others, including the smart cities topics.

As part of its research and scientific activities, the department participates in a number of projects on national as well as international scale. These are to a great extent application projects solved in collaboration with various commercial subjects. It also cultivates academic collaborations mainly with the Czech Academy of Sciences and various departments of Czech and foreign universities.

The scope of our department's activities also includes offering our services in the form of a contract-based research, expert study realizations, transport surveys, or technical consultations. The department partners not only with private subjects, but also with subjects of public administration, transport infrastructure administrators, or regions and municipalities.

The courses taught at the department focus on transport telematics and other connected fields, maintaining contact with theoretical as well as practical aspects of the issues. The department is the principal guarantor of the Intelligent Transport Systems specialization in Bachelor and Master programmes. Inviting specific professionals to participate in teaching subjects as well as in supervising student projects further develops the collaboration with our partner subjects.





## DEPARTMENT OF AIR TRANSPORT

The Department of Air Transport at the Faculty of Transportation Sciences CTU in Prague deals with the dynamic, fast-changing, and attractive area of air transport.

Department is divided into research groups focusing on the areas of:

- CNS/ATM technologies and operational procedures (includes systems belonging to the communication, navigation and surveillance domain, as well as technologies, operational procedures and future concepts related to the air traffic flow management process, airspace management and the provision of air traffic services),
- Human Factors and Automation in Aviation (specializes in the evaluation and objectification of the human factor in air transport and the establishment of effective, individual training programs for aircraft crews in stress situations, using virtual reality simulation tools to increase air traffic safety),
- Air Transport Operations (the Department is equipped with the aircraft simulators (Beechcraft, mock-up of aircraft A320 and B737 NG), on which it is possible to perform simulations of all aspects associated with the work of the crew of a transport aircraft),
- Safety and Security in Air Transport (the current topic of operational safety and security, issues of safety management systems, safety indicators, security culture and contingency plans),
- Modern trends in Airport Development (focuses on everything related to airports and heliports, concerns the optimization of airport operations to save time and save resources, whether material, human or financial),
- Economics and Legislation in Aviation (whole spectrum of operational and economic activities in aviation - meteorology, maintenance of aircraft, the economics of air transport, space technology and the legal side of air transport).

Department laboratories and research groups strive for continuous development of the current scientific knowledge and ideas, which are subsequently put into practice. The staff of the Department of Air Transport publishes their results in internationally recognized journals, such as Web of Science or Scopus. The most notable successes are the SiSel and INBAS systems designed to collect and analyze safety data. These systems are deployed at the Czech Civil Aviation Authority and in many aviation companies. The department currently works on research projects in the area of aerodromes, air traffic management and communication, navigation and surveillance, aviation operations and management, aviation safety and security, aviation economy and law, human factors and ergonomics, unmanned aerial systems.

The department collaborates with many aviation professionals on national as well as international level. To name a few examples of commercial as well as academic collaborations: Vaclav Havel Airport Prague, Air Navigation Services of the Czech Republic, ERA, Czech Airlines Technics, Civil Aviation Authority of the Czech Republic, or partner flying schools and universities abroad.

Students are continuously prepared in a complex way to become professionals in the aviation domain, e.g., the students of the Professional Pilot programme are prepared in a way that allows them to obtain the ATPL licence. The students of the Technology of Aviation Maintenance may acquire a category B Aircraft Maintenance technician license.

## DEPARTMENT OF FORENSIC EXPERTS IN TRANSPORTATION

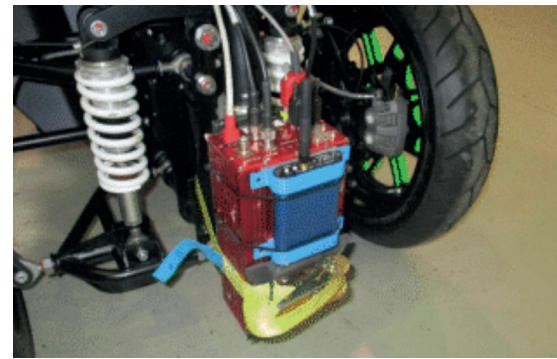
The Department is responsible for expert activities of the faculty. It also provides education, supervises students' papers, leads a post-graduate programme, conducts research and organises professional events.

The Faculty of Transportation Sciences provides forensic investigation, expert opinions or other opinions requiring a special scientific examination for the law enforcement agencies and courts. The Department of Forensic Experts in Transportation performs mainly expert opinions on road accidents, supervises and coordinates the preparation of other specialized expert opinions of Faculty.

One of the scientific projects the Department is currently working on is aimed at evaluation and validation of the EDR (Event Data Recorder) data and its application for forensic investigation. The project is joint international cooperation of several universities and includes not only theoretical analysis but also practical validation. The validation is done through various crash test scenarios and subsequent comparison of measured EDR data with data from independent measuring devices.

As part of project-based education, students take part in the "Traffic Accident Analysis" project provided by the department, where they work on their final theses. The students have the opportunity to work on various issues connected to road safety. The Traffic Accident Analysis project has been voted among the three best projects presented at our faculty for four years consecutively.





## THE DEPARTMENT OF SECURITY TECHNOLOGIES AND ENGINEERING

The department conducts education and research in the security and safety domains throughout the whole University.

The decision to establish the department with such trans-disciplinary and cross cutting activities just at the Faculty of Transportation Sciences was based on the common character of the Faculty covering systemic view on large systems and territories. Department is divided into Research groups focusing on the areas of:

- Information and telecommunication system security and safety, with special emphasize on cybersecurity and big data processing methods.
- Vehicles and transportation infrastructure security and safety, branching into two major areas: passive, active and integrated safety of vehicles including dynamic studies of vehicle behavior during and before collision; and interactive security and safety dedicated to the study of interaction of all systems in the vehicle including driver behavior.
- Critical infrastructures security and safety, that covers risk engineering and critical activities scenarios.
- Social studies group, which investigates social impact of emerging security threats, especially in cyberspace.

Laboratory of special projects supports the work of respective groups with development of specific electronic and mechanical devices for experimental work while having its own research plan, especially in the area of Internet of Things, sensors and information chain processing.

Department also employs legal expert, who serves as a valuable advisor in all research activities, which may have its specific legal implications

Since its founding, department has successfully cultivated commercial collaborations focusing mainly on commercialization of its own research results. Our partner organisations include state institutions (Ministry of Transportation, Ministry of the Interior, Road and Motorway Directorate of CR, etc.) as well as private entities (e.g. ENVitech Bohemia, Vodafone, T-mobile, Tecom and others).

Sensor networks based on department results were installed in various Czech cities.

## DĚČÍN DEPARTMENT

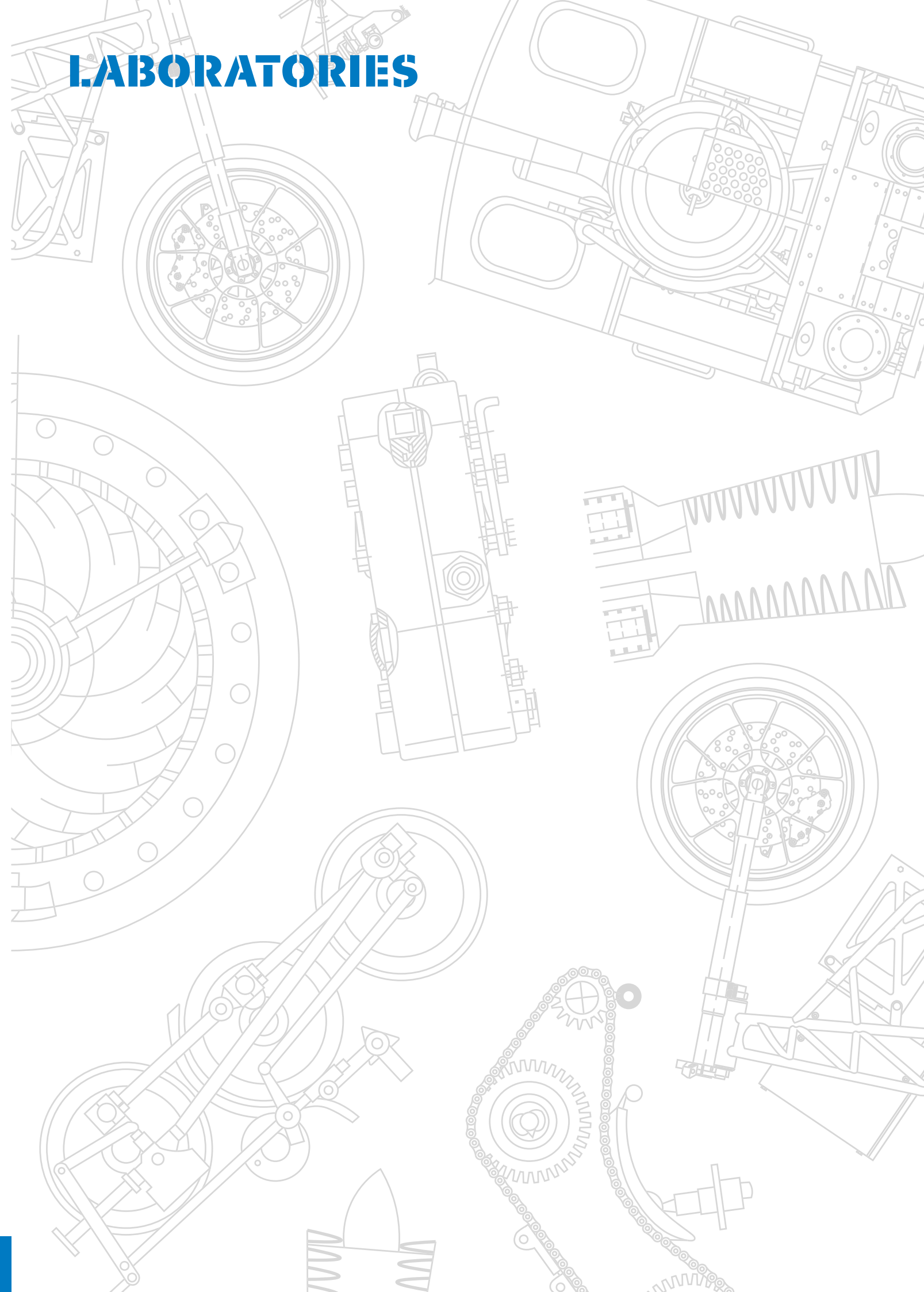
In Děčín, we offer transport study programs and link students with experts from our faculty, companies, municipalities, and schools in the North-West Bohemia and Saxony regions.

We specialize in transport simulations and visualisations. In collaboration with Czech and Saxon universities, we operate and develop a specialized simulation and visualisation laboratory, including a vehicle simulator. We are members of the Research Educational Platform of the Ústí nad Labem Region. We participate in several international projects, e.g. H2AC4schools project that realizes races between Saxon and Czech schools, teams develop and drive hydrogen powered cars.

We design and verify solutions of challenging traffic situations, draft expert reports and prepare electromobility conceptions and autonomous vehicle applications. In Děčín, we have prepared a traffic organisation model for the Vilsnická connecting road construction, we collaborated on the U SMART Zone Ústí nad Labem (an autonomous vehicles test operation zone).

We offer full-time or distance study Bachelor programs Transportation Systems and Technologies, Logistics and Transport Processes Management, and Air Transport (Bc.) and a distance study Master programme Logistics and Transport Processes Management (Ing.). University of the Third Age (U3V) offers transportation, language, computer science as well as technical-historical and humanities course.

# LABORATORIES





The Faculty is well known for its various laboratories and workplaces where students have the opportunity to learn or test their knowledge. Among those is the Driving Simulation Research Group with their car and truck simulator for example. Furthermore there are the Railway Traffic Control and Interlocking Systems Centre of excellence, which are devoted to practical research in the area of rail traffic control and security of railway operations.



### Driving Simulation Research Group

- Driving Simulation Research Group found by the Department of Vehicle Technology of Faculty of Transportation Sciences in Czech Technical University in Prague for many years has been working in the area of simulation technologies. This includes:
- Design and construction of driving simulators, including hardware design (moving platforms, vehicle cockpits, steering wheel simulation) and complete creation of virtual environment for these simulators.
- Studying and evaluation of driver behaviour and development of suitable methods and techniques for driver behaviour evaluation.
- Creating of different virtual environments for driving simulators. Design and creation of the special software modules for automatic scene generation for new scene design.
- Research and development of possible methods to use GIS data for scene creation (generation of the landscape and road characteristics based on real geographic data) to maximize the impression of reality in the driving simulators
- Research in the area of HMI, impact of HMI design (radio controls, climate control or navigation system HMI evaluation) on driving quality
- Driver's behaviour evaluation in critical situations such as driving inside road tunnels, or under fatigue and etc. Those methods are mainly based on evaluation of complex biological (EEG) and technical data measured during the experiment.

### Road Traffic Management and Modeling

The main area of interest is the application of intelligent transport systems in the management of urban agglomerations, tunnels and the motorway network. The key points are traffic surveys, traffic flow modeling and its subsequent management. For data acquisition, it has a number of traffic detectors, differing in data acquisition technology and the possibilities of sensed quantities. For traffic flow modeling, it uses various different software to verify the suitability of the proposed solutions. Another interest of the project is traffic management systems, which are subject to different requirements under different conditions. Thanks to this we can find the usability or verify the functionality of these systems in practice.

### Transport Solutions for Smart City

Smart City brings new and currently very popular solutions for modern cities, which are increasingly appearing in the Czech Republic. Students in this project can create new transport solutions that will fit into the concept of Smart City or work with already existing theoretical solutions and put them into practice. It is possible to address your focus on public transport, bicycle transport, transport at rest or, for example, the organization and coordination of all types of transport. Pros in this project comes with possible collaboration with cities and companies operating in Smart cities industry.



### Laboratory of Simulation in Aviation

The Laboratory of Simulation in Aviation was established by courtesy of the Institutional Development Plan "IRP2012" and was equipped in such a way as to simulate all activities of the twin-engine airplane's crew. Individual parts of the laboratory can be used either individually or as a comprehensive simulator of a multi-pilot airplane. The simulator is equipped for the instrument flight instruction and for training in multi-crew cooperation procedures. The modular layout of the simulator enables adjusting the components so that they correspond better to the simulated type of airplane. Since 2019 laboratory is equipped with second simulator. The second simulator is Airbus A320 simulator, which is used primarily for students of study branch Professional pilot, because this simulator enables complete simulate in full complexity all operational aspects of modern jet airliner. The laboratory assists in research purposes especially in the field of CRM/MCC research and the air transport safety.

### Mobile Laboratory for Traffic Analysis

The activities of the laboratory are focused on the support of project-oriented teaching in bachelor's and master's study programs and on the support of scientific research activities of the faculty even within doctoral study programs.

One of the main tasks of the laboratory is to ensure traffic engineering data and traffic characteristics directly from field research e.g., traffic intensity, noise, road condition, accidents). These data serve as a necessary basis for scientific research student theses.

Furthermore, the Mobile Laboratory focuses on the processing of traffic analysis. The laboratory is equipped with state-of-the-art measuring technology, which enables extensive data collection of all kinds. This data is then processed using best in field that, for example, works on the principle of image recognition.

The laboratory works closely with the Capital City of Prague, to which it has been supplying data for 5 years to update the transport model of the entire territory. Furthermore, the transport model of the key junction around the Barrandov Bridge was developed in this cooperation.

The activities of the laboratory also include extensive traffic surveys, which are the input for the creation of a general traffic, this type of survey was last carried out in Kutná Hora. The laboratory also deals with the analysis of traffic at rest, including the movements of people near shopping centers.



### Check-in and Information Systems

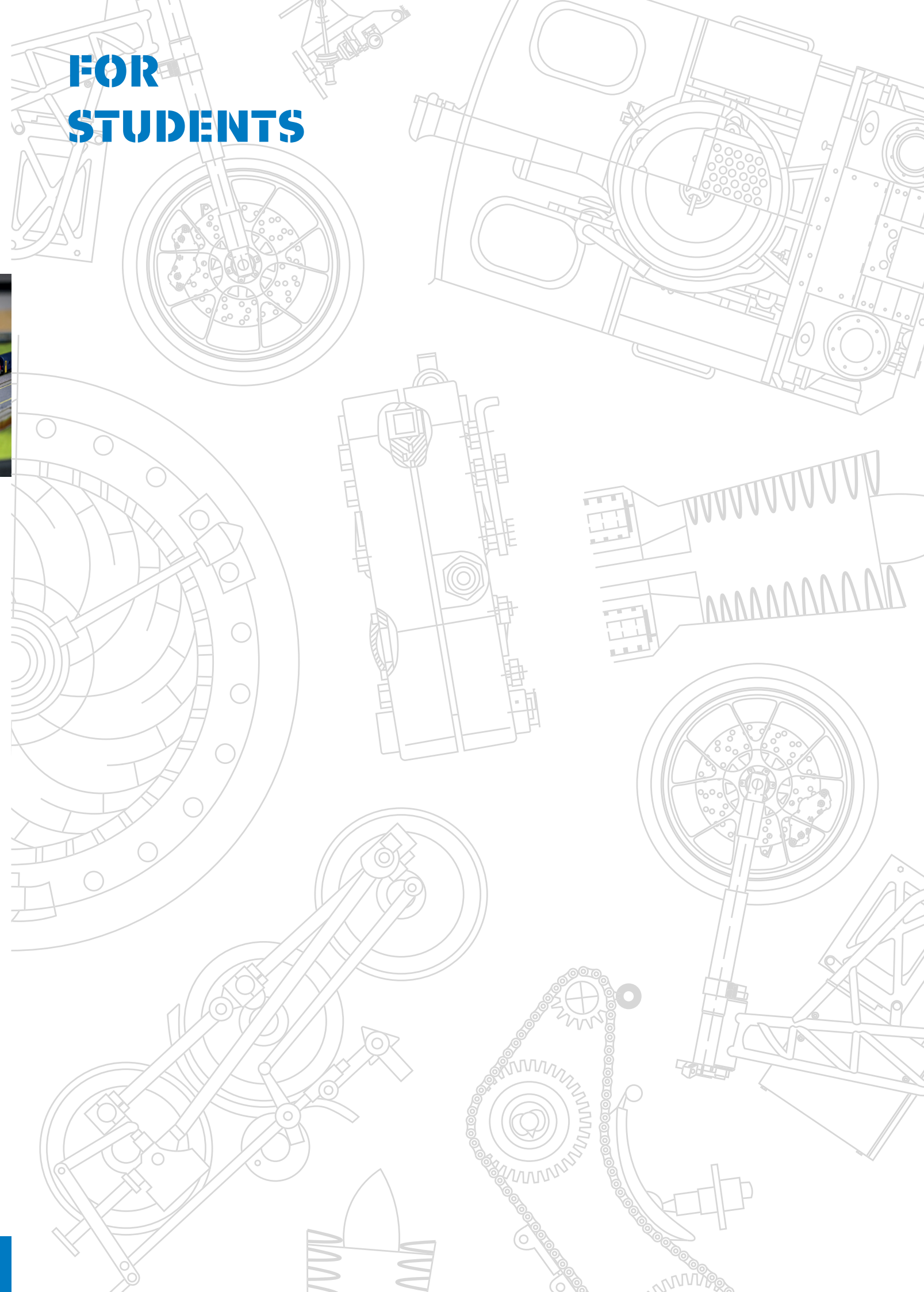
This project responds to the needs of public transport to keep it up with newest technologies. In order for public transport to remain competitive, it must not be left behind! The project is working with information and check-in systems and is focused primarily, but not only, on Prague Integrated Transport. It is working with information systems in vehicles, at stops or on the Internet, including real-time vehicle tracking. In their own work, students can deal with the analysis of individual components of these systems and participate in the current development of check-in and information systems.



### Transportation Hall of the Faculty of Transportation Sciences

This project uses the Transportation Hall, a laboratory designed for practical research in the field of railway security technology and railway traffic management technology. With the help of simulations, newly developed systems for the control and security of railway traffic are being tested, which optimize train movements, enable efficient use of infrastructure and increase the safety of railway traffic. Further development of the Traffic Hall aims at the development of a train simulator, which will enable practical training of train operators and train protection systems, including the ETCS system.

**FOR  
STUDENTS**

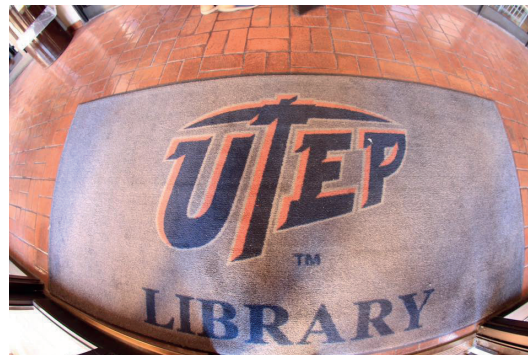




## JOINT-DEGREES

From 2010 to 2019 the faculty pioneered the transatlantic Dual Master's Degree Program in Transportation and Logistics Systems with its US partner The University of Texas at El Paso (UTEP). The program was supported by the EU-US funding under the Atlantis Program. Students of this dual degree program spent one year of their graduate studies at CTU and one year at UTEP. Upon graduation, students were awarded two Master's degrees and two diplomas, one from CTU and one from UTEP, which allowed them to pursue Ph.D. studies or explore job opportunities both in the US and in the EU.

Starting in 2020, this successful dual degree program was expanded into the field of smart and resilient cities newly bearing the name of the Dual Master's Degree Program in Smart Cities. The new program keeps our long-term US partner UTEP and due to the program's focus on cities it adds an intra-CTU collaboration with the Faculty of Architecture.



## CAREER CENTRE

The Career Centre helps graduates to enter the employment market by promoting real awareness of the situation on the employment market, helping students to select and build their work career, and helping them to improve their presentation skills and extending their opportunities after graduating.

[cvut.cz/en/career-centre](http://cvut.cz/en/career-centre)

## ERASMUS+

The FTS also offers its students the possibility to study or work abroad due to the Erasmus+ programme. Part of this programme allows international students to come study at the CTU in Prague.

[fd.cvut.cz/english/applicants/erasmus](http://fd.cvut.cz/english/applicants/erasmus)  
[naep.cz/en/](http://naep.cz/en/)

Contact:  
Ing. Patrik HORAŽDOVSKÝ  
[horazpat@fd.cvut.cz](mailto:horazpat@fd.cvut.cz)  
+420 224 359 547 / +420 224 359 548  
Konviktska 20, Prague 1, 110 00  
Czech Republic

## STUDENT ORGANISATIONS

### International Student Club (ISC)

Due to the unique Buddy Programme the ISC aims to create an international community at the Czech Technical University in Prague. The club wants to integrate exchange students into life in the Czech Republic and into events at our university. The participating students create surroundings where different cultures meet and foreign and Czech students get to know each other. In this way, the ISC contributes to understanding, friendship and cooperation among the nations in Europe and throughout the world.

[isc.cvut.cz](http://isc.cvut.cz)

### eFDrive

The eFDrive club is an interest club of the CTU Student Union. Established for students of the Faculty of Transportation Sciences, the club takes the school activities to the next level. We get things moving! You can join us at various events such as UZEL Freshmen Meeting Course, Bike Ride with the Dean, Night at the Faculty, Christmas Party, Student Day of FTS, Orienteering Prague Public Transport and Barbecue at the Faculty. We also organize interesting excursions and other programmes!

To learn more about the club, visit our website

[efd.su.cvut.cz](http://efd.su.cvut.cz)

Or follow us on:

FB @efdrive

IG @efdrive



## PARTNERS AND COOPERATIONS

The Faculty of Transportation Sciences cooperates with the Czech Academy of Sciences and industrial entities, such as Škoda Auto a. s. Mladá Boleslav, AŽD Praha s. r. o., České dráhy a. s. (Czech Railways), Letiště Praha a.s., ABS Jet a.s., Řízení letového provozu ČR s.p., SKANSKA ŽS Praha a. s., ELTODO a. s., SUDOP a. s., Metroprojekt a. s. and also with the Ministry of Transport of the CR and its research organization, the Transport Research Centre, o. CSAT - Czech Airlines Technics, a.s., ERA, a.s., Odborná společnost letecká České republiky, z.s., Aeroklub České republiky z.s., Úřad pro civilní letectví České republiky, and last but not least INTRANS a. s., Czech and Slovak combined transport. The Faculty began its cooperation with SIEMENS CZ and from this association a unique laboratory for the development and testing of applications has been established and international projects prepared.

## DORMITORIES AND CANTEENS

The Facilities administration Department of the Czech Technical University offers students and self-payers accommodation in dormitories it administers within Prague. The dormitories can be found in the vicinity of the CTU campus in Dejvice (the Dejvická, Sinkuleho, and Masarykova Dormitories), in Bubeneč, not far from Dejvice, (the Bubeneč and Orlík Dormitories), at Strahov, in the Prague city centre (the Hlávková Dormitory) next to the Faculty of electrical Engineering and the Faculty of Nuclear Sciences and Physical Engineering and close to the city centre, in the picturesque Prague 4 – Podolí.

The CTU also offers its students access to canteens which are usually close to the dormitories (for example The Studnetský Dům Cneteen and The Technical Canteen in Dejvice, The Strahov Canteen near Strahov dormitories, and others)

The Facilities Administration Department Contact:

Vaníčkova 315/7

160 17 - Praha 6

ubytovani@suz.cvut.cz

tel.: +420 234 678 387, +420 234 678 305

[suz.cvut.cz/en/international.cvut.cz/for-incomers/erasmus-and-exchange/accommodation/](https://suz.cvut.cz/en/international.cvut.cz/for-incomers/erasmus-and-exchange/accommodation/)

## PUBLIC TRANSPORTATION AND ACCESSIBILITY

All buildings of the faculty and university are easily accessible by the public transport (metro, tram, bus) and other means of transportation such as shared bikes, electric bikes, and scooters.

Public transport websites:

[pid.cz/en](https://pid.cz/en)

[dpp.cz/en](https://dpp.cz/en)

Shared vehicles websites:

[homeport.cz](https://homeport.cz)

[rekola.cz/en](https://rekola.cz/en)

[li.me](https://li.me)

## SPORT ACTIVITIES AND LEISURE TIME

The FTS and CTU offers its students various sport activities which can be found on their websites:

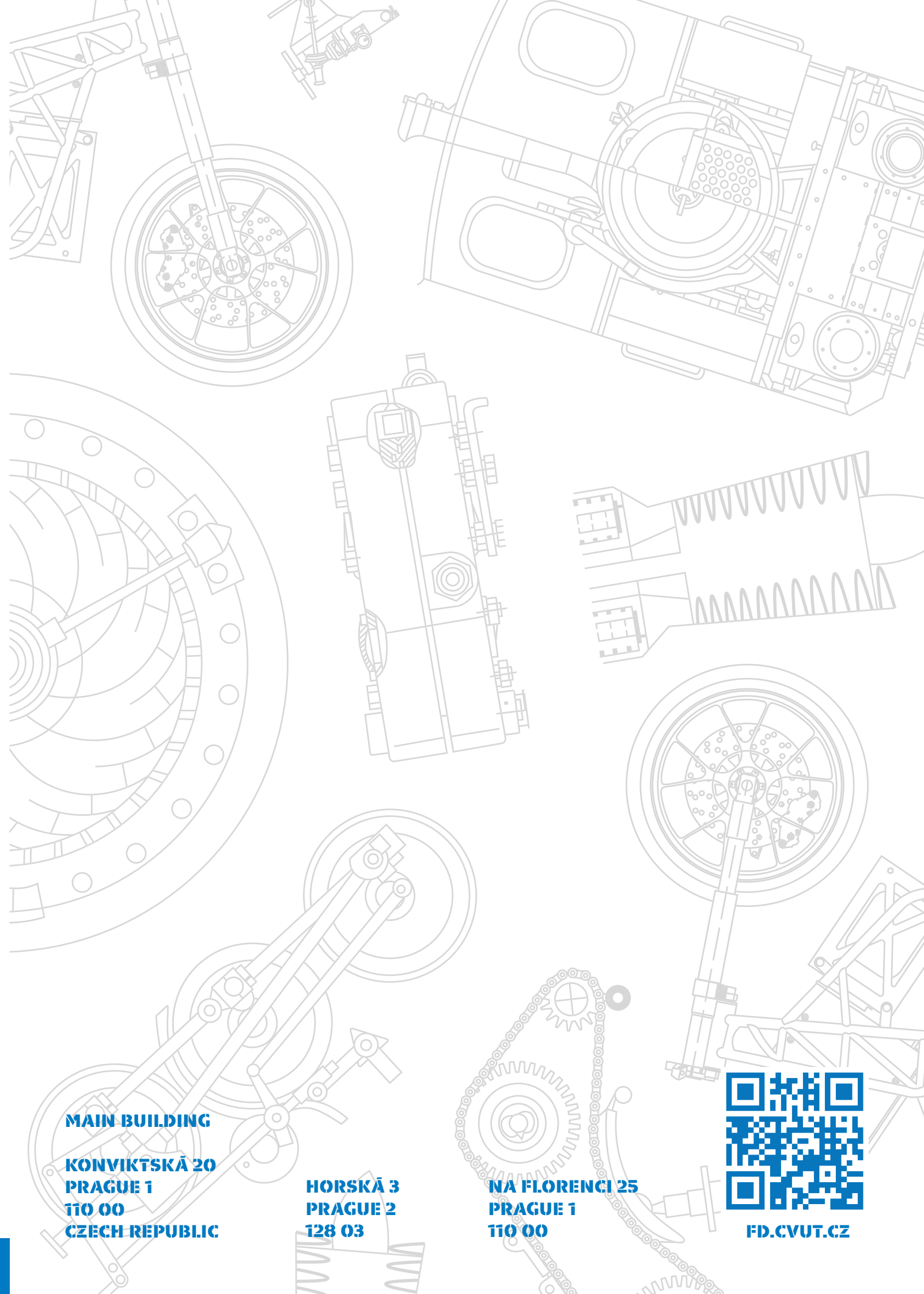
[utvs.cvut.cz/en](https://utvs.cvut.cz/en)

[isc.cvut.cz](https://isc.cvut.cz)

For more information and better student to student contact there are the facebook page and instagram of the faculty:

@dopravka





**MAIN BUILDING**

**KONVIKTSKÁ 20  
PRAGUE 1  
110 00  
CZECH REPUBLIC**

**HORSKÁ 3  
PRAGUE 2  
128 03**

**NA FLORENCI 25  
PRAGUE 1  
110 00**



**FD.CVUT.CZ**

