

<b>UNIVERSITY OF PARDUBICE FACULTY OF TRANSPORT ENGINEERING</b>	
<b>Directive No. 3/2019</b>	
Subject:	<b>Rules for admission to doctoral study programmes for the academic year 2019/2020</b>
Applicable to:	Applicants for study
Issued on:	January 30, 2019
Effective from:	February 1, 2019 to October 31, 2019
Prepared by:	Ing. Zuzana Gojná, Research and Development
Submitted by:	Ing. Ladislav Řoutil, Ph.D., Vice-Dean for Research and Foreign Cooperation
Approved by:	doc. Ing. Libor Švadlenka, Ph.D., Dean

### Article 1 Introductory Provisions

(1) The Dean of the Faculty of Transport Engineering (DFJP) of the University of Pardubice (UPa) announces, in accordance with Section 49 of Act No. 111/1998 Sb., on Universities, as amended, and Article 7 of the DFJP Statutes for the academic year 2019/2020, the admission procedure for the first year of doctoral study programmes "Transport Means and Infrastructure" and "Technology and Management in Transport".

(2) Anticipated number of admitted applicants according to study programmes and forms of study:

Study Programme	Form of study	
	Full-time	Combined
Transport Means and Infrastructure	7	7
Technology and Management in Transport	7	7

**Deadlines for submission of applications:**      **May 31, 2019 (First Round)**  
    **September 9, 2019 (Second Round)**

**Dates of the admission procedure:**                 **June 21, 2019 (First Round)**  
    **September 13, 2019 (Second Round)**

### Article 2 Admission

(1) The application for study can be submitted preferably in electronic form published at <http://eprihlaska.upce.cz>, **no later than May 31, 2019 (or September 9, 2019, as relevant)**, including instructions.

The following documents must be sent by post to **the Faculty of Transport Engineering, Research and Development, Studentská 95, 532 10 Pardubice** no later than the closing date for applications:

- a) dissertation topic
- b) curriculum vitae
- c) certified copies of the Diploma and the Diploma Supplement
- d) if submitting a proposal for their own topic of the dissertation, applicants need to provide an abstract, a proposal of methods of solution to be used in the dissertation, and the approval

of the training place for which the student applies. Topics will be approved by the respective DFJP branch boards.

(2) Applicants who complete their Master's degree in the academic year 2018/2019 may submit the Diploma with the Supplement subsequently. Those who do not complete their Master's degree at DFJP UPa will, at the latest at the date of the admissions, submit at least the school's confirmation of successful completion of the Master's degree programme.

(3) The application form can also be filled in on the prescribed form (SEVT form "Application for study at a university in the doctoral study programme") and sent to the address mentioned above together with the above-mentioned attachments. The topic of the dissertation thesis is to be stated directly in the application form.

An administrative fee of CZK 500 shall be paid by bank transfer or payment order (exclusively by Type A) to the University of Pardubice's account **no later than May 31, 2019 (or September 9, 2019, as relevant)**.

University of Pardubice account number	37030561/0100
variable symbol	5920
specific symbol	applicant's branch number (in the case of e-application)
	the applicant's birth number (in the case of the printed form)
constant symbol	379 for postal order payment
	308 for wire transfer

(4) The printed application form must be accompanied by a proof of payment of the administrative fee (copy of the last part of the type A bill, a copy of an account statement or a payment notification if using wire transfer). If submitting the electronic application, applicants do not have to send a confirmation of payment. The administrative fee is non-refundable.

(5) An application without the attached proof of payment of the fee (if the printed form is used) or an application with formal shortcomings will not be registered and the applicant will be asked for immediate completion. If the applicant fails to remove the shortcomings within the specified deadline, he/she will be excluded from the admission procedure. A medical certificate is not required for the application.

(6) An applicant whose application has been registered but who fails to provide the required documents (see above) by the closing date for the applications will not be eligible for the entrance examination, will not be invited to it and will not be admitted.

(7) On the basis of a duly registered application and the timely submission of the required documents, the applicants will be invited to the entrance examination.

### **Article 3 Entrance Examination**

(1) The first round of the entrance examination has been set **for June 21, 2019, the second round for September 13, 2019**. The entrance examination will take place at: University of Pardubice, Faculty of Transport Engineering, Studentská 95, 532 10 Pardubice. The room, time and form of the entrance examination will be specified in the invitation.

(2) The English language entrance exam consists of a written test in English and a personal interview in connection with the professional content of the specific topic of the dissertation. The admission

exam requires at least B2 Level English according to the Common European Framework of Reference for Languages (CEFR), i.e. the applicant uses the language independently and effectively using the appropriate linguistic means. It assumes the ability to work independently with professional literature. The professional interview requires the professional knowledge of the applicants for inquiring into the issues of the submitted topic of the doctoral dissertation.

(3) If multiple applicants register the same topic of the doctoral dissertation, the admission committee determines the order of the applicants for admission according to the result of the admission procedure.

#### **Article 4** **Evaluation of the entrance examination results**

(1) The foreign language is evaluated in relation to the percentage of the applicant's success rate in each part of the examination. The maximum number of points is 40, of which 30 in the written test and 10 in the oral part. The condition is to pass the written test with at least 50 percent (15 points) and the total score at least 60 percent, i.e. 24 points.

(2) The applicant may also apply for recognition of a language test on the basis of a completed State Final Examination in that language or another level-appropriate examination.

(3) Based on the result of the English language entrance examination and the following oral interview, the admission committee *recommends or does not recommend the admission of the applicant to doctoral studies*. The applicant will be informed about the result of the oral interview immediately after the interview, which will be confirmed by his/her signature on the entrance examination report, which is part of the application form.

The result of the admission procedure will be the basis for the Dean's decision on the *admission or non-admission of the applicant to doctoral studies*.

(4) Failure to attend the admission procedure for medical or other serious reasons will be subject to further discussion only if the faculty sends invitations for an alternative date for admission procedure.

(5) The results of the admission procedure will be published on the UPa website - [www.upce.cz](http://www.upce.cz) under the applicant's registration number (the applicant's university number is on the first page of the e - application form at the top right) or the applicant's birth number and initials, **no later than June 28, 2019 (or September 20, 2019, as relevant)**. The manner of publishing the results of the admission procedure must respect the principle of the protection of personal data. Documentation on the admission procedure will be deposited with the DFJP Scientific Research Department, and will be made available to every participant in the admission procedure on request for 15 days after the admission exam. **The Dean's written resolution on the results of the admission procedure** will be hand-delivered to the applicants admitted to study when enrolling in the study; to those not admitted, the decision will be delivered by registered mail to their hands within 14 days of the date of entrance examinations.

In Pardubice on January 30, 2019

doc. Ing. Libor Švadlenka, Ph.D.  
Dean of DFJP

Annex:

Topics for doctoral dissertation theses for the academic year 2019/2020 in the study programmes "Transport Means and Infrastructure" and "Technology and Management in Transport".

**Doctoral Dissertation Thesis Topics for academic year 2019/2020**  
**Study program: Transport Means and Infrastructure**

**Department of Transport Means and Diagnostics**

**Performance assessment of lubricants and friction modifiers for the wheel–rail interface**

**Supervisor:** doc. Ing. Petr Voltr, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

In railway operation, materials for lubrication or, more generally, modification of friction conditions at the wheel–rail interface are used. Laboratory assessment of performance of these materials (i.e. if and to what extent they display the required effect on friction conditions) employs twin-disc machine testing. Testing methods exist and are even reflected in European standards; in practical use, however, some uncertainties and imperfections show up. The dissertation should aim at improvement and clear definition of methodology for twin-disc testing or possibly propose new procedures. The research should also include finding correlation between results of these tests and full-scale roller rig measurements.

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**Transient phenomena and combined factors in wheel–rail adhesion**

**Supervisor:** doc. Ing. Petr Voltr, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

Conditions determining the adhesion performance of rail vehicles in operation result from a superposition of many factors which, in addition, can change in time. It is desirable to deal particularly with the cases of opposite effects, e.g. contamination and HPF modifier or conditioning by sliding. These phenomena are often studied in a constant slip setup, however real vehicle performance depends on realistic scenarios with variable slip. The aim of the dissertation should be to progress knowledge on combined and non-stationary adhesion phenomena with the use of roller rig experiments and modelling.

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**Design of computational models of dynamic states simulation for car tire loading**

**Supervisor:** doc. Ing. Jan Krmela, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The aim is to design computational models in a selected program based on the finite element method, which will simulate dynamic operating conditions of tire loading and give adequate results. Verification will take tests on a tire dynamic test machine.

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**Design of a method for evaluating of experimental data from a dynamic tire test machine for tire loading prediction**

**Supervisor:** doc. Ing. Jan Krmela, Ph.D.

**Supervisor - specialist:** Ing. Petr Jilek, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The aim is to propose a method for the evaluation of experimental data in order to predict dynamic tire loading and stiffness parameters. The output will also be a mathematical relationship that can predict the behavior of the rolling tire based on vehicle speed, inflation pressure, contact surface, casing geometry and other parameters.

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**Mathematical description of tire loading states in relation to used tire casing materials with experimental verification**

**Supervisor:** doc. Ing. Jan Krmela, Ph.D.

**Supervisor - specialist:** Ing. Petr Jilek, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The aim is to find a mathematical description of the relationship between load and deformation of the tire casing, which will help to express the various static and dynamic tires states with include the material parameters of the individual tire casing parts, the tire inflation pressure and the geometry of the tire casing. Experimental verification will be done by measuring on static and dynamic test machines.

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**Computer program formation to obtain stiffness of car tires from the aspect of material, geometry and other tire casing parameters**

**Supervisor:** doc. Ing. Jan Krmela, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The aim is creation of a computer program to obtaining tire stiffness. Input data into the program are material parameters of each individual tire casing parts with include material models of elastomers, operating conditions, experimental data from dynamic tests etc. Verification will be done on based results from tests on dynamic test machine.

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**Mathematical model of secondary suspension of rail vehicles**

**Supervisor:** doc. Ing. Jaromír Zelenka, CSc.

**Supervisor - specialist:** Ing. Martin Kohout, Ph.D.

**Mode of study:** full time

**Annotation:**

The utilization of computational simulations in design phase or in approval process of rail vehicles is based on knowledge of the characteristics of spring and damping elements. The aim of the thesis is to create a parametric mathematical model of the secondary suspension used in computational simulations of running and guiding behavior of rail vehicles based on theoretical knowledge and results of some experiments. Part of the work should be the design of the suspension testing methodology, the design of the test equipment and the realization of some tests in the laboratory conditions of the Jan Perner Transport Faculty.

## **Department of Transport Structures**

### **Probabilistic lifetime evaluation of steel bridges**

**Supervisor:** doc. Ing. Bohumil Culek, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The work will deal with the methodology of probability assessment of fatigue life of steel bridges with regard to variability of input data. The subject of the work will be analysis of current state of knowledge, evaluation of probabilistic fatigue lifetime methodology, realization of strain gauges measurements of selected bridge constructions, creation of FEM models, implementation of experimental measurements on dynamic test stand, validation / verification of results.

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### **Empirical determination of fatigue curves**

**Supervisor:** doc. Ing. Bohumil Culek, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The work will focus on the empirical determination of the fatigue curves with respect to the sample geometry and the mode of cyclic loading. The subject of the work will be analysis of the current state of knowledge, with regard to various hypotheses of fatigue lifetime assessments, determination of boundary conditions and their influence on the calculation, determination of evaluation methodology, validation of results on dynamic test stand. The theoretical and experimental procedures will be used

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## **Department of Mechanics, Materials and Machine Parts**

### **Multiphase Steels for Transport Means Safety Parts**

**Supervisor:** prof. Ing. Eva Schmidová, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The doctoral work will be focused on research in the field of advanced high-strength steels, applied for transport means passive safety parts. The analyses of material processes, under influence of the high strain rate and internal imperfections according the fracture mechanics parameters, will be the main part of the work. Complex material analyses will be used for research of included strengthening and plasticity processes.

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### **Behavior of high-strength steels for transport means exposed to lower temperatures**

**Supervisor:** prof. Ing. Eva Schmidová, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The research will be focused on transition behavior of high-strength steels or their welding joints, leading to safety decrease due to lowered temperature. The intention is to bring new information towards to prediction of the limit state based on fracture energy capacity drop, including the fracture mechanics approach. Comprehensive material analyzes of involved processes, influencing the fracture mechanisms will be the substantial part of experimental study.

### **Physical energy pretreatment of metallic materials for glue joint at transport vehicle construction**

**Supervisor:** doc. Ing. Pavel Švanda, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

Aim of this work is to study of pretreatment of metallic surface by physical energy for glue joints. The surface pretreatment may be usage at transport vehicle manufacturing. Theoretical part of study will be target the selection of suitable pretreatments. In practical part of study will be evaluate the surface state before and after pretreatments. In the work will be study the strength of prepared glue joints and their stability during service life.

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## **Department of Electrical and Electronic Engineering and Signaling in Transport**

### **Indirect Microwave Holography for Transport Security Imaging Systems**

**Supervisor:** prof. Ing. Vladimír Schejbal, CSc.

**Supervisor - specialist:** Ing. Dušan Čermák, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The basic theory of indirect microwave holography and how it can be used for the determination of antenna far field patterns and the reconstruction of antenna aperture fields. Analyses how the technique can be used for both planar scanning and cylindrical scanning. Measurement analyses for medium gain antennas of wide spectral extent and imaging of concealed metal and dielectric objects. Utilization for transport security imaging systems.

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### **MIMO Antennas for Transport Telecommunications**

**Supervisor:** prof. Ing. Vladimír Schejbal, CSc.

**Supervisor - specialist:** Ing. Dušan Čermák, Ph.D.

**Mode of study:** full time / part time

**Annotation:**

The basic theory of antenna arrays, especially MIMO antennas. The new technologies such as 5G, UWB, IoT and automotive applications considering various issues such as electromagnetic compatibility, electromagnetic interferences and electromagnetic susceptibilities.