



KANDÓ KÁLMÁN DOCTORAL SCHOOL
SELF-ASSESSMENT

Valid for students enrolling from 01.09.2024.

1. Introduction

The Kandó Kálmán Doctoral School was established with the transformation of the former Kandó Kálmán Graduate School of Mechanical Sciences (Vehicles and Mobile Machines) (formerly Multidisciplinary Technical Sciences) and as the successor to the Baross Gábor Graduate School of Transportation Sciences and continues its activities in the field of transportation and vehicle sciences. Besides transportation and vehicle sciences, its priority areas are logistics and mobile machines.

The head of the Doctoral School is Dr. Péter Gáspár, a regular member of the Hungarian Academy of Science (MTA) and a full-time professor at BME. He received his PhD degree in 1997 from the Faculty of Transportation Engineering and Vehicle Engineering of the Budapest University of Technology and Economics, and his DSc scientific degree at the Hungarian Academy of Sciences in 2007. In 2016 he was elected as a correspondent member and in 2022 as regular member of the Hungarian Academy of Sciences.

In 1990 he started his work as a researcher in SZTAKI, and since 2016 he has been a research professor in the same place. Since 2017 he has been the head of the Systems and Control Lab. Since 2013 as a professor at BME, he has been the head of the Department of Control for Transportation and Vehicle Systems. He is also a member of IFAC's Committees for Vehicle Control and Transportation.

He is a co-author of several books on control theory. He is the author of 227 journal papers and 310 conference presentations with more than 2300 references. His research interest includes linear and nonlinear systems, robust control, system identification and control identification. His industrial-motivated interest includes mechanical systems, vehicle structures and vehicle control.

The program in the Doctoral School lasts for 8 semesters, consists of study work, research work, educational activities. The courses in the Doctoral School are an integral part and build on the current BSc and MSc programs of transportation engineering, logistic engineering and vehicle engineering, and autonomous vehicles at the Faculty of Transportation Engineering and Vehicle Engineering. The program covers two key areas: a high-level knowledge in science, a high level of theoretical expertise, specific subjects in mechanical (vehicle) sciences (vehicles and mobile machines), transport and vehicle sciences and logistics science, as well as profession-specific (topic-specific) optional subjects. Listening to subjects takes place during the first 4 semesters of the program.

There are currently 69 PhD students taking part in the program, grouped per department:

	ALRT	GJT	KJIT	KTKG	RHT	VJIT	Total
State scholarship	3	10	13	6	2	1	35
Self-financing	1	5	1	1	0	1	9
Foreign	2	0	0	17	3	3	25
Total	6	15	14	24	5	5	69

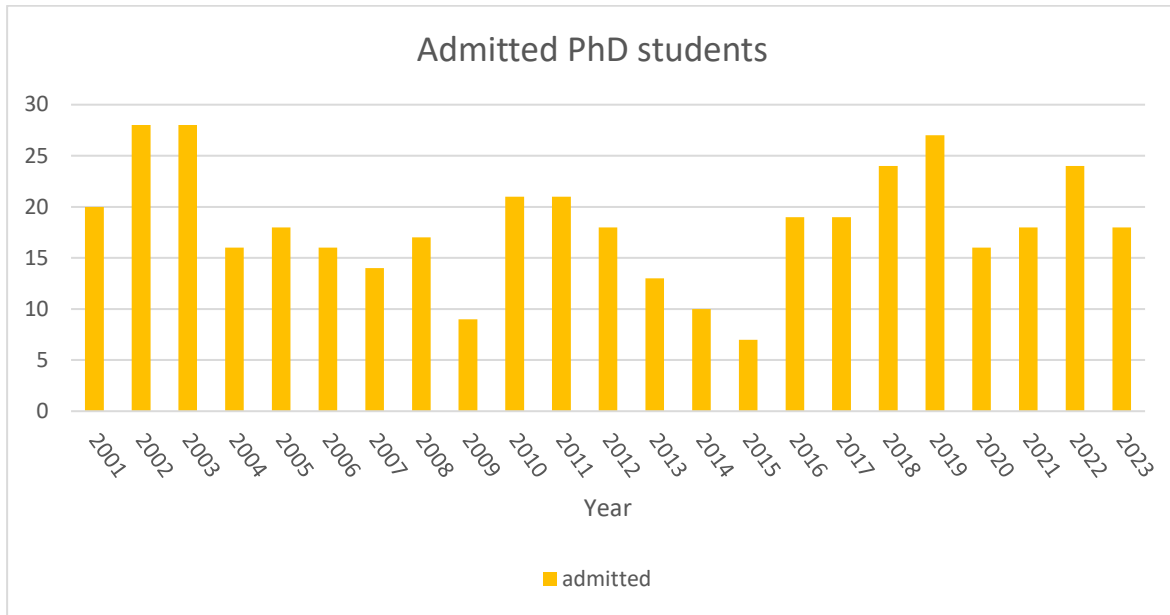
1. table Distribution of the PhD students of the doctoral program

Table 2 shows the status of the PhD students in the Doctoral School in 2023/2024.

completed	7
active	66
dismissed	2
graduated	16
passive	3
total	94

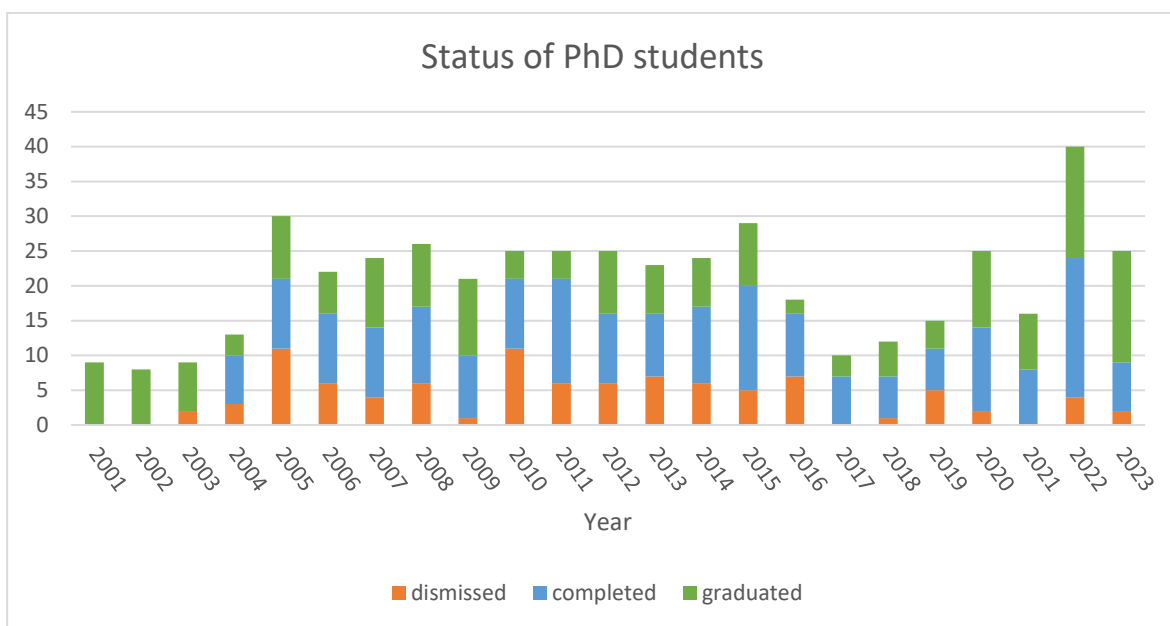
2. table Status of the PhD students in the Doctoral School

Figure 1 shows the admitted students to the Doctoral School since 2001 by year.



1. figure Number of admitted students to the Doctoral School since the start of the program

Figure 2 shows the status of PhD students in the Doctoral School since 2001 by year.



2. figure Status of PhD students in the Doctoral School since the start of the program

2. Core members

The number of core members of the Doctoral School is 9, of whom Dr. József Bokor and Dr. Péter Gáspár are regular members of MTA, while Dr. Péter Béda, Dr. Csaba Csiszár, Dr. László Lengyel, Dr. Ádám Török, Dr. Tamás Tettamanti, Dr. Máté Zöldy, Dr. István Varga have a DSc degree at MTA. The number of lecturers is 109, of which 28 are announcers of research topics and 34 are supervisors. The age composition of members is shown in Table 3.

Age (year)	-40	40-45	46-50	51-55	56-60	61-65	66-70	70-
Number	0	4	2	0	0	2	0	1

3. table Age composition of the core members

3. Organization and operation

The current issues of the Doctoral School program are reviewed several times each semester by the University Habilitation Committee and Doctoral Council (EHBDT) and by the Doctoral School Council (DIT).

The operational cases of the program are managed by a staff member of the Dean's Office of the Faculty with supervision of the Head of the Doctoral School. The Doctoral School asks for topic proposals and publishes research topics every semester. The DIT decides on the adoption of the topics and supervisors. Topics are published on the www.doktori.hu website.

The entrance exam for the published topics is organized by the Dean's Office of the Faculty. The admission committee (FB) is appointed by the DIT. The admission committee evaluates on a scale of 0 and 100 points the interview, previous academic results, language skills and previous professional and scientific activity. The requirement of admission is to reach at least 60 points. However, 60 points is only a necessary condition for the admission, but it does not guarantee the success and does not imply to provide any scholarship. Based on the report of the admission committee, the DIT proposes to the Dean of the Faculty the admission and the award of the state scholarships. Admissions decisions are made by the Dean of the Faculty.

Each PhD student has one and only one supervisor, who manages and assists the PhD student with full responsibility working on his/her studies, research work, publication of results and the preparation of the PhD dissertation. Dual supervision is only possible in case of a program of an international cooperation or in case of an interdisciplinary research based on that the topic is accepted by the DIT and published with the prior consent of the EHBDT¹.

The doctoral topic or the supervisor/consultant may be changed by the DIT either by their request or the request of the PhD student or by its own competence for the coming period, when appropriate. The DIT asks for the opinion of the head of the supervisor before making a decision. In the event of a change in the person of the supervisor for any reason, the DIT will decide on the name of the supervisor(s) appearing on the dissertation².

The Habilitation Committee and the Doctoral Council (HBDT) conducts the PhD degree acquisition procedure. Based on the proposal of the HBDT, the degree is awarded by the EHBDT. The PhD degree acquisition requirements are elaborated by the HBDT and approved by the EHBDT. The PhD degree acquisition requirements are reviewed annually by the HBDT and, if necessary, amended with the approval of the EHBDT. The actual PhD degree acquisition requirements are available on the website of the Doctoral School.

¹ BME DHSZ 10.§ (6)

² BME DHSZ 10.§ (10)

4. Infrastructure conditions and program capacity

The infrastructure conditions for research are provided by the departments of BME Faculty of Transportation Engineering and Vehicle Engineering (KJK). All departments at the KJK are participating in the doctoral program. The rooms used for research are at departments, such as BME J, St, and L, as well as the lab of building AE. With the help of companies with modern industrial equipment and foreign research institutions, the Faculty is trying to provide the missing equipment and experimental tools for the PhD research at the University.

The infrastructure for education and research purposes is similar to the structure of BME:

- computer equipment in university management to which all enrolled students have access (EISZK, SSC-HSC),
- faculty-managed IT labs,
- server machines, workstations, computer labs.

The BME National Technical Information Centre and Library (BME OMIKK) is the largest technical library in the country. The library serves its readers in 8,200 m² with more than 2 million documents. The library has about 100 databases. The university has more than 5000 endpoints to access literary databases.

5. Results

The number of students admitted to the Doctoral School in last five years is shown in Table 4.

Year	2019	2020	2021	2022	2023
Person	27	16	18	24	18

3. table Number of admitted PhD students to the Doctoral School

The development of the number of graduates in the last five years is shown in Table 5.

Year	2019	2020	2021	2022	2023
Person	4	11	8	16	16

4. table Number of graduated PhD students of the Doctoral School

Table 6 summarizes the successful defenses of the last five years with authors, titles, supervisors.

PhD student	Supervisor	Defense Year	Dissertation title
Venczel Márk	Dr. Veress Árpád	2023	Multidisciplinary analysis and development methodologies for torsional vibration dampers in vehicle industry
Ismael Karzan Saleem	Dr. Duleba Szabolcs	2023	Urban Public Transportation Service Quality Improvement: Using Hybrid Decision-Making Methods
Mesterné Monostori Judit	Dr. Kádár Botond	2023	Robustness-oriented analysis, (re)design and management of supply chains

Cao Hang	Dr. Zöldy Máté	2023	Investigating Autonomous Vehicle Navigating Module In Roundabout Considering Safety And Mobility
Kun Krisztián	Dr. Weltsch Zoltán és Dr. Líska János	2023	Járműipari szerszámok strukturált felületeinek vizsgálata mikro- és makrogeometriai jellemzők változtatásával
Bata Attila	Dr. Lovas Antal és Dr. Weltsch Zoltán	2023	Járműiparban használt műanyag nanokompozitok visszadolgozhatóságának vizsgálata
Fehér Árpád	Dr. Aradi Szilárd	2023	Reinforcement learning-based motion planning methods
Boldizsár Adrienn	Dr. Mészáros Ferenc	2023	Áruszállítási áramlatok modellezése és gazdasági elemzése Európában
Baár Tamás	Dr. Luspay Tamás	2023	Optimal Decoupling of Dynamical Systems: A Convex Approach With Aerospace Applications
Shatanawi Mohamad Mahmoud Aqil	Dr. Mészáros Ferenc	2023	Efficient application of road pricing schemes in the era of autonomous and shared autonomous vehicles
Szabó Zsombor	Dr. Sipos Tibor	2023	A közlekedési rendszerekre vonatkozó adminisztratív elválasztó hatások térstatisztikai vizsgálata
Patartics Bálint	Dr. Vanek Bálint	2023	Uncertain systems: analysis and synthesis with application to flutter suppression control
Hegedűs Tamás	Dr. Németh Balázs	2023	Decision and control methods for overtaking strategies of autonomous vehicles
Alkharabsheh Ahmad Mohammad	Dr. Duleba Szabolcs	2023	Supporting public transport development decisions by newly emerged MCDM techniques
Basargan Hakan	Dr. Gáspár Péter	2023	Integration of adaptive cruise control and semi-active suspension control to enhance road stability and driving comfort
Kondor István Péter	Dr. Zöldy Máté	2022	Technical and environmental investigation of the use of waste-based propellant-diesel oil mixtures in internal combustion diesel engines
Korkulu Sezen	Dr. Bóna Krisztián	2022	Ergonomics as a social sustainability component for improvement of manual material handling process and human well-being
Ortega Ortega Jairo Fabian	Dr. Tóth János	2022	An Integral Study of Park and Ride for Urban Mobility
Mihály András	Dr. Gáspár Péter	2022	Fault-tolerant control design of in-wheel electric vehicle based on energy efficiency, vehicle dynamics, road environment and driver behavior
Obaid Mohammed	Dr. Török Árpád	2022	Macroscopic Modelling of the Effects of Autonomous Vehicles and Cooperative Intelligent Transport Systems
Pauer Gábor	Dr. Török Árpád	2022	Modelling of transport management processes applicable to highly

			automated vehicles with an emphasis on safety and efficiency issues
Hamadneh Jamil Mohammad	Dr. Esztergár-Kiss Domokos	2022	The Implications of Integrating Autonomous Vehicles into the Transport System
He Yinying	Dr. Csiszár Csaba	2022	Analysis Methods and Models Facilitating Mobility as a Service Based on Autonomous Vehicles
Berczeli Miklós	Dr. Weltsch Zoltán	2022	Development of automotive joints with surface treatment procedures
Hegedüs Ferenc	Dr. Bécsi Tamás	2022	Model based motion planning for highly automated road vehicles
Törő Olivér	Dr. Bécsi Tamás	2022	Object-tracking and maneuver estimating methods for advanced driver assistance systems
Horváth Márton Tamás	Dr. Varga István	2022	Methods for traffic state estimation and routing in urban road networks
Szabó Ádám	Dr. Bécsi Tamás	2022	Model based control of electro-pneumatic actuators
Forberger Árpád	Dr. Béda Péter	2022	Digitally controlled dynamic systems
Lu Qiong	Dr. Tettamanti Tamás	2022	Impacts of Automated Vehicles on Traditional Road Traffic
Lengyel Henrietta	Dr. Szalay Zsolt	2021	Investigating the potential conflict situations of highly automated vehicles and transport infrastructure
Fényes Dániel	Dr. Németh Balázs	2021	Application of data-driven methods for improving the performances of lateral vehicle control systems
Puskás Eszter	Dr. Bohács Gábor	2021	Industry 4.0 solutions for the implementation of logistics networks based on the Physical Internet
Nguyen Dinh Dung	Dr. Rohács Dániel	2021	Developing transport management system for integrating drones into a smart city environment
Foroozan Zare	Dr. Veress Árpád	2021	Virtual prototyping of gas turbine components – aerodynamic redesign and analysis of academic jet engine
Lakatos András Rudolf	Dr. Mándoki Péter	2021	Development of an optimization model for managing parallelism in domestic intercity and long-distance public transport
Mátrai Tamás	Dr. Tóth János	2021	Complex analysis of urban bicycle transport systems using innovative methods
Kinzikeyev Sergey	Dr. Boros Anita	2021	Modeling recovery of railway system after earthquakes
Varga Balázs	Dr. Tettamanti Tamás és Dr. Kulcsár Balázs	2021	Modeling and control of autonomous public transport vehicles
Zarkeshev Azamat	Dr. Csiszár Csaba	2020	Information management models and methods for innovative transportation systems and services
Ghadi Ma'en	Dr. Török Árpád	2020	Methods of segmenting and analyzing of road accident data
Wangai Agnes	Dr. Rohács Dániel	2020	Sustainability-Focused Models to Support the Strategic Rail Development

			Processes in Emerging Countries
Kale Utku	Dr. Rohács József	2020	Operators (Pilots, ATCOs)' Load Monitoring and Management
Vass Sándor	Dr. Zöldy Máté	2020	Examination of fuel injection in a compression ignition engine
Moslem Sarbast	Dr. Duleba Szabolcs	2020	Analyzing Public Involvement in Urban Transport Decision Making by MCDM Methodology
Farkas Bálint	Dr. Duleba Szabolcs	2020	Evaluation of the operational models of rail freight transport, examination of development possibilities
Lukács Judit	Dr. Török Árpád	2020	Examination of the detectability of traffic accidents, with particular regard to the case of collisions of lower intensity
Farooq Danish	Dr. Juhász János	2020	Integration of mathematical and physical simulation to reduce traffic hazards by studying behavior of driver
Katona Géza	Dr. Juhász János	2020	Development of a multimodal route planning and optimization algorithm for passenger transport tasks
Maghrour Zefreh Mohammad	Dr. Török Ádám	2020	Dynamics of the Urban Road Traffic Flow and its Effect on Urban Road Sustainability
Csonka Bálint	Dr. Csiszár Csaba	2020	Development of electromobility services
Weber Franz-Josef	Dr. Tulipánt Gergely és Dr. Zobory István	2020	Further development of railway brake discs using new cast iron materials
Rózsa Zoltán	Dr. Szirányi Tamás és Dr. Kovács Gábor	2019	Intelligent Range Sensing and Modeling Methods in Mobile Machine Automation
Földes Dávid	Dr. Csiszár Csaba	2019	Development of innovative transport systems and services
Bárdos Ádám	Dr. Németh Huba	2019	Diesel engine air-path management
Hlinka József	Dr. Bán Krisztián és Dr. Weltsch Zoltán	2019	Investigation of the wetting ability of soft solders used in the vehicle industry
Harth Péter	Dr. Béda Péter	2019	Investigation of the effect of symmetry on the static analysis of regular and near-regular structures in the vehicle industry

5. table Successful defenses in the Doctoral School

6. Analysis of C-SWOT by the Kandó Kálmán Doctoral School

<i>External barriers, constraints</i>	
<ul style="list-style-type: none"> • Due to the significant industrial attraction in the field of engineering, fewer and fewer people choose the doctoral program. • Due to the limited resources, journals with scientific excellence in Hungary have been discontinued or are less frequently published. • Due to insufficient budgetary support, the necessary teacher and student mobility (conference participation, presentation) and adequate amount of equipment development (tools, computer programs) are not ensured. 	
<i>Strengths</i>	<i>Weaknesses</i>
<ul style="list-style-type: none"> • Doctoral program with decades of history. • The discipline defines social mobility and quality of life that has developed over the last 10 years and has a major role in the national economy. • The obtained scientific results can be applied in a short period in the creation of locally developed vehicle and mobile machine systems. • The existence of educational and research communities with national and international recognition. • Effective training among governmental funded full-time students and the increasing number of PhD degrees partially provide a supply for university lecturers and researchers. • The effectiveness of state-funded students as well as the increasing trend in successful graduations in the past period, partly ensure the supply of university lecturers and researchers. • Effective participation in EU projects. • The realization of the Stipendium Hungaricum programme with a high number of international students. 	<ul style="list-style-type: none"> • Low performance indicators of self-financing students. • Lack of supply for university lecturers and researchers because the talented young people are typically getting a job in the industry.
<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> • Stronger research cooperation with SZTAKI, KTI, national, and foreign universities. • Increased involvement in the European network of transportation, vehicle, and logistics engineering faculties in order to increase the mobility of PhD student mobility. • Increased involvement of those with PhD degree in the activities of the MTA Scientific Committees. • More efficient control of the work and publication activities of PhD students. • Moral and financial recognition of the effective activities of the supervisors and teachers. 	<ul style="list-style-type: none"> • The increase in the number of young teachers who are well-prepared at the theoretical level, but have less practical background, does not contribute sufficiently efficiently to the development of the practical training. • In the field of engineering, there is a significant industrial attraction among both students and teachers.

Budapest, 19.02.2024.

Dr. Gáspár Péter
Head of the Doctoral School