KANDÓ KÁLMÁN DOCTORAL SCHOOL

SELF-ASSESSMENT

Name of institution:	BME Faculty of Transportation Engineering and Vehicle Engineering Transport and Vehicles Sciences Habilitation Committee and Doctoral Council
Presetned by:	Prof. Gáspár Péter
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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 corresponding 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.

Since 1990 he has been working as a researcher in the MTA Systems and Control Lab, and since 2016 he has been a research professor in the same place. He is the Head of the Vehicle Dynamics and Control Research Group within the Laboratory. As a professor at the BME, he has been the Head of the Department of Control for Transportation and Vehicle Systems since 2013. 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. In addition, he is the author of 139 journal papers, 7 book chapters and 296 conference presentations with more than 1804 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 integral part and build on the current BSc and MSc programs of transportation engineering, logistic engineering and vehicle engineering 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 84 PhD students taking part in the program, grouped as follows:

	ALRT	GJT	JSZT	KJIT	KUKG	VRHT	Total
State scholarship	3	6		9	8	3	29
Government sponsorship						1	1
Reimbursement					1		1
Self-financing		9		4	1	4	18
Self-financing foreign					1	1	2
Stipendium Hungaricum	3	1	2	4	17	6	33
Total	6	16	2	17	28	15	84

1. table Distribution of PhD students

completed	94
active	84
dismissed	91
obtained a degree	63
passive	1
deleted	20
done	2
Total	355

2. table All students of the Doctoral School since the start of the program (2001)

2. Core members

The number of core members of the Kandó Kálmán Doctoral School is 7, of whom Dr. József Bokor is a regular member of the MTA, Dr. Péter Gáspár is a corresponding member of the MTA, and Dr. Péter Béda, Dr. László Lengyel, and Dr. Tamás Szirányi are Doctor of the MTA. In addition to them, the emeritus of the core members are Dr. Éva Gilicze Kövesné, Dr. János Takács, Dr. Tánczos Lászlóné and Dr. István Zobory. The number of instructors is 81, of which 32 are proposed supervisors and 38 are supervisors. The age composition of the members is shown in the table 3.

Age (year)	-40	40-45	46-50	51-55	56-60	61-65	66-70	70-
Number	1	1	1	0	2	1	1	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 in 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 the 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 the supervisors. Topics are published in circulars and on the website of the Doctoral School.

The entrance exam for the published doctoral 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 preparedness shown during the interview, previous academic results, language skills and previous professional and scientific activity. The requirement of the 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 in the framework of an international cooperation or in case of an interdisciplinary research based on that the topic is accepted by the Doctoral School Council (DIT) and published with the prior consent of the University Habilitation Committee and Doctoral Council (EHBDT).

The doctoral topic or the supervisor may be changed by the DIT for the period ahead, either by the request of the PhD student or in appropriate cases by its own competence. The DIT asks for the opinion of the head of the supervisor before making a decision.

The organization of conducting the PhD degree acquisition procedure is done by the Habilitation Committee and the Doctoral Council (HBDT). Based on the proposal of the HBDT, the degree is awarded 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 PhD minimum requirements are available on the website of the Doctoral School.

4. Infrastructure conditions and program capacity

The infrastructure conditions for the research are provided by the departments of the BME Faculty of Transportation Engineering and Vehicle Engineering (KJK). All six KJK departments 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 computer 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, 7 reading rooms with 520 seats, 65 public computer access, more than 2 million documents, 100,000 volumes of free-shelf stock, 3,400 current magazines and 5,000 electronic journals. The library has about 100 databases (CD-ROM, internet/online). The university has 5000 endpoints to access literary databases.

5. Results

The number of students admitted to the Doctoral School in the last five years according to Table 2.

Year	2014	2015	2016	2017	2018
Person	10	7	18	19	24

2. table

The development of the number of graduates in the last 5 years is shown in Table 3.

Year	2014	2015	2016	2017	2018
Person	6	9	2	3	5

3. table

Table 4 summarizes the successful defenses of the last 5 years, with authors, titles, supervisors.

PhD student	Supervisor	Year of Defense	Dissertation title
Rinkács Angéla	Bohács Gábor	2018	Analysis and development of information links between the material flow system and its simulation environment in order to improve logistical characteristics

Nagy Enikő	Csiszár Csaba	2018	Integration of aviation information systems, improvement of methods of airport passenger handling
Gyimesi András Dániel	Bohács Gábor	2018	Modeling construction processes in a logistical context
Bicsák György	Veress Árpád	2018	Cost Efficient Solutions for Small Aircraft Development Processes using Numerical Modelling Tools
Andrejszki Tamás	Török Ádám	2017	Mathematical modelling of complex economic efficiency assessment methods for intelligent flexible public transport systems
Hargitai László Csaba	Rohács Dániel	2017	Development of motion simulation method for predicting the maneuverability of river freight vessels
Sipos Tibor	Bokor Zoltán és Mészáros Ferenc	2017	Development of a model underpinning the development of road infrastructure road safety
Hajdu Sándor	Gáspár Péter	2016	Reduce column swings of single-column warehouse loading machines using modern management techniques
Esztergár-Kiss Domokos	Csiszár Csaba	2016	Optimization of multimodal travel chains
Bárány Gábor	Gáspár Péter	2016	Lead-acid battery state detection for automotive electrical energy management
Szimandl Barna	Németh Huba	2015	Observer based feedforward feedback control of electro-pneumatic clutch systems
Bauernhuber Andor	Markovits Tamás	2015	Laser beam metal-polymer bond design and properties test
Aradi Szilárd	Gáspár Péter	2015	Application Of Vehicle-to-Infrastructure Networks In Vehicle Control And Monitoring Systems
Meyer Dóra Zsófia	Tarnai Géza	2015	Safety level-based evasion in civil aviation
Csikós Alfréd	Varga István	2015	Modelling and control methods for the reduction of traffic pollution and traffic stabilization
Bánlaki Pál Károly	Takács János	2015	Further development of vibration and noise diagnostic end control system for motor vehicle drivetrain mains
Sándor Zsolt Péter	Csiszár Csaba	2015	Modelling of an integrated road transport information system, influencing operational characteristics
Szabó Bálint	Palkovics László	2015	Relationship between low-speed track movements of tire vehicles and tire deformation
Nagy András	Rohács Dániel	2015	Development of a measuring and simulation environment that determines the movement process of small air equipment
Dömötör Ferenc Gyula	Takács János	2014	Advanced technological diagnostics of machining processes for the boundary surfaces of complex vehicle materials (hybrids, composites)
Szabó Attila	Lovas Antal	2014	Test of composition, phase and voltage status in automotive alloys by thermovolt measurement
Hankovszki Zoltán	Palkovics László	2014	Sideslip ange estimation based commercial vehicle stability control
Ficzer Péter	Borbás Lajos	2014	Rapid prototype numerical and experimental strength analysis
Weltsch Zoltán	Lovas Antal	2014	Testing of wetting phenomena between Ag-based melts and ceramics to underpin automotive bonding technologies

4. table

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

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<tr><th colspan="2">External barriers, conditions - C</th></tr>
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There is no academic research institute in the field of mechanical sciences, some of the former industrial research bases (e.g. MÁV-VATUKI, Ganz-HUNSLET , IKARUS) have been ceased, industrial research and development sites have been established within enterprises, which are operating within the framework of industrial commercial interests.
Due to a lack of resources, journals with scientific excellence in Hungary have been partially discontinued or are less frequently published (GÉP).
In the fields of vehicle technology, transportation and logistics, there is a very little number of journals with impact factor, and the number of potential foreign institutional partners is limited.
Due to insufficient budgetary support, the necessary teacher and student mobility (conference participation, presentation) and the development of equipment (tools, computer programs) are not ensured.
The disadvantageous economic situation reduces the resources for external training.

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<tr><th>S - Strengths</th><th>W - Weaknesses</th></tr>
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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 publicly funded full-time students providing a supply of university lecturers and researchers.
Effective participation in vehicle related EU projects.

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Ageing of core members of the Doctoral School.
Difficulties and insufficient level of publication activity, particularly in foreign language.
Low performance indicators of self-financing students.

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<tr><th>O - Opportunities</th><th>T - Threats</th></tr>
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Stronger research cooperation with MTA SZTAKI, KTI and foreign universities.
Increased involvement in the European network of transportation, vehicle and mobile machines 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.
Increased control of the work and publication activities of PhD students.
Moral and material recognition of the effective activities of the supervisors and teachers.

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Due to the timeline of the new program structure, expected reduction in the number of applications.
Difficulties in resupplying core members due to the changes in the number of students and supervisors.
Increase in the proportion of theoretically well-prepared young teachers without professional experience supports less effectively the development of a practical program.

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