Session Chair: Imre Kocsis

10:50 – 11:10	Szilvia Homolya **Engineers of the Future and AI: How Does Today's Mathematics Education Prepare Them**
11:10 – 11:30	Imre Kocsis, Dóra Sipos **Elements of the Distributed Knowledge Transfer in Engineering Mathematics Education**
11:30 – 11:50	Csaba Kézi **Applications of Mathematics in Engineering Education**
11:50 – 12:10	Adrienn Vámosiné Varga, Boglárka Burján-Mosoni **On Short Tests Measuring Competencies as Predictors of Dropout Among Mechatronics Engineering Students**
12:10 – 12:30	Attila Szántó **The Impact of Vehicle Development Projects on the Development of the Practical Side of Education**

10:50 – 11:10	**Szilvia Homolya** - Associate Professor, University of Miskolc, Institute of Mathematics, Department of Analysis

Engineers of the Future and AI: How Does Today's Mathematics Education Prepare Them

The rise of artificial intelligence (AI) in modern technology raises pressing questions about the structure of university-level engineering education. It is particularly important to examine to what extent the mathematical training of engineering students provides the knowledge essential for implementing AI and handling data processing tasks necessary for AI training, such as data cleaning, filtering, and encoding. This study analyzes the intersection of mathematical curricula and artificial intelligence, with a focus on areas such as linear algebra, probability, statistics, numerical methods, and other fields crucial for data processing and modeling. The research aims to determine whether current educational practices meet industry expectations and to identify potential gaps and opportunities for improvement. The findings of this analysis could contribute to the development of a more effective and goal-oriented engineering education system.

11:10 – 11:30	**Imre Kocsis** – Professor, University of Debrecen, Faculty of Engineering, Department of Basic Technical Studies

Elements of the Distributed Knowledge Transfer in Engineering Mathematics Education

According to our experience, the efficiency of knowledge transfer in engineering education is significantly increased if certain higher-level topics (concepts, methods) are presented in the professional environment in which they are used. Possible forms of this include: presenting new mathematical knowledge in the context of technical subjects; reviewing and challenging what was previously learned in mathematical subjects in the form of tasks formulated with professional text; and summarizing knowledge related to technical subjects in short, specific mathematical notes. Problem-based mathematics education is a tool and not a goal; if implemented well, it does not violate the integrity of mathematical knowledge; on the contrary, greater motivation contributes to the absorption and deepening of knowledge. In the presentation, we present a case study on the application of the distributed knowledge transfer method.

11:30 – 11:50	**Csaba Kézi** – Associate Professor, University of Debrecen, Faculty of Engineering, Department of Basic Technical Studies

Applications of Mathematics in Engineering Education

Mathematics education plays an important role in engineering education. To learn engineering subjects, it is important to acquire the right basic mathematical knowledge. However, it is also important to give real-life examples that have already been used in the teaching of basic mathematics.

11:50 – 12:10	**Adrienn Vámosiné Varga** – Associate Professor, University of Debrecen, Faculty of Engineering, Department of Basic Technical Studies

On Short Tests Measuring Competencies as Predictors of Dropout Among Mechatronics Engineering Students

While we are experiencing an IT revolution due to the development of artificial intelligence and robots, student drop-out is a serious problem in technical higher education worldwide. One of the reasons of that is a significant number of students cannot meet the requirements of the basic subjects. By drop-out the sustainability of an educational institution can be significantly reduced, as students are a direct source of income. The primary task of the instructors of students entering the bachelor's program is to recognize as soon as possible those students who are at risk of dropping out due to the lack of basic skills. The ability to manipulate with symbols and the abil-ity to diagrammatic reasoning is essential for a mechatronics engineer. We examined the afore-mentioned abilities of 41 international and 32 Hungarian mechatronics engineering students and found a positive correlation between learning the basics of programming and their symbolic manipulation abilities by two tests. The results can be used to predict the dropout rate of pro-gramming courses.

12:10 – 12:30	**Attila Szántó** – Assistant Lecturer, University of Debrecen, Faculty of Engineering, Department of Basic Technical Studies

The Impact of Vehicle Development Projects on the Development of the Practical Side of Education

In engineering education, in addition to theoretical knowledge, the practical approach to technical tasks and problems plays a very important role. Consider, for example, industry, the automotive industry, and motorsports, where engineers are most often faced with a real-world problem, which they then solve using their theoretical knowledge and existing practical experience. Solving the tasks would be very difficult or impossible without practical experience. Therefore, practical education plays a significant role in education and higher education, during which engineering students can encounter real engineering problems and challenges, for example through project tasks or in other ways, for which they must find solutions. The Faculty of Engineering of the University of Debrecen has been conducting various vehicle development and construction projects for a long time, as well as student car racing and motorsport teams, which greatly contribute to the practical development of the students participating in them. These projects are based on a real-world engineering problem, and their solution requires knowledge gained in theoretical classes. Thus, while solving these, students, on the one hand, get an idea of the practical application of theoretical knowledge, which often helps in understanding it, and on the other hand, while solving the task, they also gain real practical (engineering) experience, which can be useful in their later work. In this publication, we present the projects underway at the Faculty of Engineering, the vehicle development teams, from which engineering tasks and projects waiting to be solved are usually born. We also analyse the effects of such practical education based on real projects on students. We also present the modern laboratories belonging to the Faculty of Engineering, which are essential for the implementation of projects. Finally, we will briefly describe our further plans and vehicle development projects, which will also contribute to the development of the practical side of education