

LAUNCHING OF THE LOGISTICS DOUBLE DIPLOMA PROGRAM BETWEEN HUNGARY AND KYRGYZISTAN: FROM START TO TEACHING

PÉTER VERES¹ – PÉTER TAMÁS² – AKYLBEK UMETALIEV³

Abstract: *In recent years, there has been a growing demand for education in the field of intralogistics, as companies began to treat this segment as a separate area, not just as part of procurement or storage. As a result, the demand for professionals specialized in this area has increased, not only in Europe but worldwide. The University of Miskolc, in collaboration with its former partner, the Kyrgyz State Technical University, has established a dual degree program with a significant emphasis on production logistics. This article presents the origin and background of the program, the initial challenges of course launches and how they were overcome, as well as providing insights into the future of logistics education.*

Keywords: *collaboration, double degree, logistics education*

1. THE IMPORTANCE OF EDUCATION IN THE FIELD OF LOGISTICS

Logistics education stands as a cornerstone in the contemporary landscape of global trade and commerce. As the world becomes increasingly interconnected, and businesses expand their operations across borders, the efficient management of supply chains has never been more critical [1]. At the heart of this efficiency lies logistics education, which not only imparts essential skills but also fosters a deep understanding of the intricate networks that underpin modern commerce.

In recent years, the advent of digitalization and Industry 4.0 has revolutionized logistics operations. From inventory management to transportation logistics, technology has streamlined processes, enhanced visibility, and opened avenues for innovation. Consequently, proficiency in digital tools and platforms has become a fundamental requirement for professionals in the logistics sector. [2] Logistics education serves as the conduit through which individuals gain mastery over these digital advancements, enabling them to navigate the complexities of contemporary supply chain management with agility and precision. [3]

Moreover, the globalization of markets has led to a surge in international trade, presenting both opportunities and challenges for businesses worldwide. In this context, logistics education assumes paramount importance as it equips individuals with the knowledge and skills necessary to navigate the intricacies of global supply chains. Understanding diverse customs regulations, optimizing transportation routes across continents [4], and fostering cross-cultural collaboration [5] are just a few examples of the expertise imparted through logistics education by new methods and gamification [6].

¹ Senior lecturer, University of Miskolc, Miskolc, Hungary
peter.veres@uni-miskolc.hu

² University professor, Head of Institute, University of Miskolc, Miskolc, Hungary
peter.tamas@uni-miskolc.hu

³ University professor, Head of Logistics, Kyrgyz State Technical University, Bishkek, Kyrgyzstan,
akylbek.umetaliev@gmail.com

Furthermore, in an era where innovation drives competitive advantage, higher education in logistics becomes imperative. Advanced degrees and specialized courses offer professionals the opportunity to delve deeper into logistics principles, strategic management, and emerging technologies. This advanced knowledge not only empowers individuals to stay ahead of the curve but also cultivates a culture of innovation within the industry, driving continuous improvement and evolution.

To create an outstanding educational program, we also need to look for good practice, like the collaboration between Massachusetts Institute of Technology (USA) and Zaragoza Logistics Center (Spain), which offers a rigorous curriculum blending theoretical knowledge with practical applications in logistics and supply chain management [7]. Another good double degree program is jointly offered by Tilburg School of Economics and Management (Netherlands) and LUISS Guido Carli Private University (Italy), which offers students insights into Nordic and Central European logistics practices [8]. There are several other opportunities to apply for a double degree program in the field of logistics, but they are mostly focus on the management and supply chain fields, and not the engineering work and intra logistics parts [9].

As we look into the fields of logistics education, it becomes evident that certain subjects stand out as foundational pillars. Supply chain management, transportation logistics, inventory control, and warehouse management are among the core areas of studies. Additionally, subjects such as procurement, sustainability in logistics, and data analytics play pivotal roles in shaping modern logistics practices [10]. In our institute we like to expand this knowledge and offer a new perspective to students with a curriculum focused on inner logistics, mainly in production, in addition to automation, robotics and operation optimisation.

2. EDUCATIONAL BACKGROUND OF THE INSTITUTE OF LOGISTICS

The Institute of Logistics at the University of Miskolc stands out as a pillar in Hungary, renowned for its excellence in both education and research within the field of logistics. With a rich history and a commitment to innovation, the institute plays a pivotal role in shaping the future of logistics professionals in the country [11].

In terms of education, the Institute of Logistics offers comprehensive programs that equip students with the skills and knowledge necessary to excel in the dynamic world of logistics. These programs are designed to provide a solid foundation in core areas in both intra and transportation logistics for university students and higher-level vocational training for post-graduate professionals. The courses include the engineering sides of:

- supply chain management with transportation logistics,
- production management,
- procurement and distribution,
- warehouse management and inventory control
- packaging and commissioning,
- automatization and robotics.

These courses also incorporate cutting-edge topics such as digitalization, sustainability, optimization, and data processing. Through a blend of theoretical instruction and practical experience, students are prepared to tackle real-world challenges and drive innovation within the industry.

Moreover, the institute's emphasis on research further distinguishes it as a leader in the field. Through collaborative partnerships with industry stakeholders and participation in national and international research projects. Members at the Institute of Logistics are at the forefront of advancing knowledge and solving complex logistics problems. Their research contributes not only to academic scholarship but also to the development of practical solutions that enhance the efficiency and effectiveness of logistics operations in Hungary and beyond.

The Institute of Logistics' commitment to excellence extends beyond the classroom and research lab. It fosters a dynamic learning environment characterized by mentorship, collaboration, and a spirit of continuous improvement. By nurturing talent and cultivating a culture of innovation, the institute plays a vital role in driving the growth and competitiveness of Hungary's and other nations logistics sector.

3. EDUCATION BEYOND EUROPEAN BORDERS: THE PRODLOG PROJECT

The Erasmus+ program is a European Union program that supports education, training, youth, and sport. It aims to provide opportunities for students, teachers, and institutions to study, train, gain work experience, and volunteer abroad. The program encourages cross-border cooperation between universities, vocational schools, and other educational institutions across Europe and beyond. This was the frame for the Erasmus+ Prodlog project, which brought together 6 Asian and 4 European universities with the aim of introducing a Production Logistics MSc program at the 6 Asian universities to meet local industrial and European demands [12]. The project aimed to strengthen Asian-European educational and research connections. Led by OVGU (Germany, Magdeburg) between 2017 and 2021, with €840,000 in funding, the project resulted in the establishment of 6 logistics laboratories tailored to individual needs. Additionally, there was a 3-month combined teacher-researcher training from European partners. Two universities have already launched the MSc program in 2019 as a pilot, while others are in the process of launching. The project has resulted in numerous joint publications. The list of partners:

- OVGU (Germany, Magdeburg) *Project leader*
- UM (Hungary, Miskolc)
- SIGMA (France, Aubière)
- UAS (Germany, Landshut)
- MADI (Russia, Moscow)
- VSUWT (Russia, Novgorod)
- GKU (Kazakhstan, Almaty)
- KazATC (Kazakhstan, Almaty)
- KSTU (Kyrgyzstan, Bishkek)
- KNAU (Kyrgyzstan, Bishkek)

These partners worked tirelessly to achieve the goals of the Erasmus+ Prodlog project, leveraging their collective expertise and resources to introduce specialized logistics education programs, foster international collaboration, and address the evolving needs of the logistics industry in both local and European contexts.

While the formal conclusion of the project marked the end of a significant chapter, the enduring relationships and collaborative efforts among partners have continued to thrive. Through ongoing publications, initiated projects, travels, and curriculum development,

partners have demonstrated a steadfast commitment to advancing the field of logistics education and research, underscoring the lasting impact of the Erasmus+ Prodlog project.

Among these partners, the Kyrgyz State Technical University (KSTU) remains the primary partner with whom the Institute of Logistics in the University of Miskolc maintains an excellent relationship to this day.

Following the conclusion of the project, the KSTU expressed a need for further development and digitalization of their courses. Recognizing the challenges of undertaking this endeavour independently, they sought assistance from the University of Miskolc. After extensive discussions and several meetings, taking into account the unique characteristics of both institutions, it was determined that online education might not be the optimal solution. However, during these deliberations, the idea of a dual-degree program emerged as a promising alternative.

4. THE UM-KSTU LOGISTICS ENGINEERING DOUBLE DEGREE PROGRAM

A double degree (DD) program in higher education, particularly at the master's level, offers students the unique opportunity to immerse themselves in two distinct academic programs simultaneously, thereby broadening their educational horizons and expanding their knowledge base. By completing the requirements for two separate degrees concurrently, students not only gain specialized expertise in multiple fields but also receive two distinct credentials upon graduation, significantly enhancing their academic qualifications and career prospects [13].

4.1. Advantages and disadvantages of double degree programs

Pursuing a double degree in higher education presents several challenges advantages and disadvantages to students and teachers which they should carefully consider.

Advantages of a Double Degree:

1. *Enhanced Career Prospects:* Holding two master's degrees can significantly enhance students credentials and increase competitiveness in the job market. Employers often value the diverse skill set and specialized knowledge gained through multiple degree programs.
2. *Broader Knowledge Base:* Pursuing two degrees allows students to gain expertise in complementary areas, providing a broader understanding of the field and its interdisciplinary aspects. This can be particularly advantageous in complex fields like logistics, where multiple disciplines intersect.
3. *International Experience:* Many double degree programs involve studying at two different institutions, often in different countries. This offers students the opportunity to gain international exposure, develop cross-cultural skills, and build a global network of contacts, which can be invaluable in an increasingly interconnected world.
4. *Depth of Specialization:* By focusing on two specific areas of study, students can achieve a deeper level of specialization than they might in a single degree program. This can be advantageous for those seeking careers in niche areas of logistics or aiming for leadership roles requiring specialized expertise.

Disadvantages of a Double Degree:

1. *Increased Workload:* Balancing coursework, assignments, and examinations from two separate degree programs can significantly increase the workload for students. Teachers can also be overwhelmed because, these students usually need more attention and/or need specific subjects with teaching materials to create. This heightened academic demand requires strong time management and organizational skills to ensure success in both programs.
2. *Extended Duration:* Double degree programs typically take longer to complete compared to single-degree programs due to the additional coursework and requirements. This prolonged duration may delay entry into the workforce or other post-graduation plans, impacting career progression and earning potential.
3. *Administrative Complexity:* Coordinating requirements, schedules, and logistics between two institutions can be administratively complex. Students may encounter challenges in navigating different academic calendars, credit transfer processes, and administrative procedures, requiring careful planning and coordination. There is also more workload for teachers and administrative staff. They usually have to use two systems and make papers that both institution and government approves.
4. *Cost Considerations:* Pursuing two degrees simultaneously can be financially burdensome, as it often entails additional tuition fees, living expenses, and other associated costs. Students should carefully assess the financial implications of a double degree program and consider available funding options to mitigate financial strain.
5. *Cultural Adjustment:* If the double degree program involves studying at institutions in different countries, students may experience challenges related to cultural adaptation and integration. Differences in language, customs, and social norms can pose significant hurdles to students' overall well-being and academic success.
6. *Visa Requirements:* Studying abroad as part of a double degree program may necessitate obtaining appropriate visas or permits, which can be time-consuming and complex. Navigating visa regulations and immigration procedures adds an additional layer of administrative burden for international students.
7. *Time Dilation:* Students enrolled in double degree programs may experience a sense of time dilation, wherein the extended duration of the program can lead to feelings of fatigue, burnout, or a loss of momentum. Maintaining motivation and focus over an extended period can be challenging, requiring resilience and perseverance from students. Teachers who travel back and forth between countries can be affected as well.

Overall, while a double degree offers numerous advantages for both students and teachers, including expanded academic horizons and enhanced career opportunities, and academic progress should weigh these benefits against the potential challenges and disadvantages to make informed decisions about their paths.

4.2. Starting the DD between UM-KTSU

The process of initiating the double degree program began in 2022, following multiple in-person and online meetings between the collaborating institutes. These discussions laid the

groundwork for addressing administrative tasks, which included extensive communication with governmental authorities. Particularly, efforts were made to navigate visa-related challenges, as Hungarian nationals are permitted to stay in Kyrgyzstan for up to 60 days at a time, while Kyrgyz nationals require special visas for longer than 90 day stays in Hungary, necessitating meticulous planning and coordination. Both parties, the University of Miskolc and the Kyrgyz Technical University, have established strong connections with the respective embassies, which significantly mitigates potential visa-related challenges.

To facilitate the administrative process, numerous personal meetings and email exchanges were conducted with governmental parties to ensure compliance with visa regulations and streamline documentation requirements. Notably, Hungarian government funding and institutional support were instrumental in providing heavily discounted tuition fees for Kyrgyz students. Additionally, affordable accommodation options were made readily available, simplifying the logistical aspects of studying abroad.

Despite initial challenges, administrative procedures were successfully completed. While administrative paperwork was initially unavailable in Miskolc, collaborative efforts led to the development of necessary documentation over the course of the last year. Presently, the double degree program is fully supported by the Hungarian Ministry of Education, ensuring seamless implementation and operation.

The development of the curriculum posed one of the most significant challenges for the double degree program. Each party, the Kyrgyz and Hungarian institutions, brought their own preferences and expertise to the table, resulting in divergent focuses on transport logistics and industrial logistics, respectively. While this diversity offered students a valuable opportunity to acquire knowledge in both fields, reconciling these differences to create a cohesive curriculum proved to be a complex task. Allocating limited credits and lecture hours within the curriculum posed constraints on the inclusion of essential subjects from each domain. To address this challenge, extensive collaboration and compromise were necessary. Multiple rounds of discussions and negotiations were held to identify common ground and prioritize essential topics from both disciplines. This involved careful consideration of the learning objectives, core competencies, and practical applications of each subject area. Ultimately, a balanced curriculum was developed that integrated key concepts from transport logistics and industrial logistics while ensuring coherence and relevance to the overall program objectives. This curriculum allowed students to gain a holistic understanding of logistics principles, encompassing both the macro-level aspects of transportation and the micro-level intricacies of warehouse management and inventory control.

In addition to addressing the distinct preferences in transport and industrial logistics, both the Kyrgyz and Hungarian parties recognized the importance of aligning the curriculum with industry needs and integrating principles of Industry 4.0, digitalization, and software usage. These modern concepts are crucial for preparing students to thrive in the rapidly evolving landscape of engineering logistics and supply chain management. This can be seen in Table I, where the current curriculum is shown.

The master students will begin their studies at KSTU for the first semester, after which they will alternate between the two institutes every semester. The subjects taught by KSTU are highlighted in yellow, while those from UM are in blue.

In the first year, there's a mix of subjects, with students attending classes at their current location but having them accepted in different semester for administrative purposes. Despite some differences in subject names between the institutes, the content is similar, as

indicated in the accepted column. Additionally, at the end of their studies, each student will write a master thesis.

Table I.
Curriculum of KSTU-UM Logistic Engineer Double Degree program

Courses	1. Semester (KSTU)			2. Semester (UM)			3. Semester (KSTU)			4. Semester (UM)		
	Lecture	Practical course	Credit	Lecture	Practical course	Credit	Lecture	Practical course	Credit	Lecture	Practical course	Credit
1. Numerical Methods and Optimization (online)	2	2	5									
2. English for technical & scientific purposes	2	2	5									
3. Information and Identification Technologies in Logistics	2	2	5									
4. Resource Efficient Production Logistics	2	2	5									
5. Project work - practical work	2	2	5									
6. Logistics Strategies and Methods	2	2	5									
7. Economics and cost analysis	2	2	5									
8. Intelligent Material Handling Machines and Systems				2	2	5						
9. Industrial Automation				2	2	5						
10. Introduction into Datamining				2	2	5						
11. Simulation Examination of Logistics Systems				2	2	5						
12. Mechatronics in Logistics				2	2	5						
13. Lean fundamentals				2	2	5						
14. Mathematical Modelling of log. Processes							2	2	5			
15. Project Management and risks in Logistics							2	2	5			
16. Energy and Resource Efficient Industry							2	2	5			
17. Management of Business Processes in Logistics Operations of an Enterprise							2	2	5			
18. Designing and Organization of Storage and Handling systems							2	2	5			
19. Master thesis I.							0	10	15			
20. Quality Management of Logistics Systems										2	2	5
21. Industry 4.0 Information Systems										2	2	5
22. Modeling and Simulation of Transport Systems										2	2	4
23. Legal Regulation of Logistics Activities, Procedures										2	0	1
24. Master thesis II.										0	10	15
Total credits			35			30			40			30

This arrangement allows students to benefit from the expertise of both institutions and gain a comprehensive understanding of logistics from different perspectives. Alternating between the two institutes also provides students with a diverse learning experience and exposure to different teaching methods and approaches. Ultimately, this structure prepares

students for the complexities of the logistics industry and equips them with the skills and knowledge needed to excel in their career like:

- Modern Information Technologies
- Intelligent Material Handling
- Industrial Automation
- Industry 4.0 and Logistics
- System Engineering and System Modelling
- Data Structures and Algorithm
- Introduction into Datamining
- Simulation Examination of Logistics Systems
- Standard Solutions in Logistics
- Modelling and Simulation of Transport System

The first group of students can begin applying for courses starting in February 2024, with the inaugural semester scheduled to commence in September of the same year. This timeline marks an exciting milestone in the implementation of the double degree program between KSTU and UM, offering prospective students the opportunity to embark on their academic journey and benefit from the unique educational offerings of both institutions.

4. CONCLUSIONS

In conclusion, the collaborative efforts between KSTU and UM in establishing a double degree program in logistics represent a significant achievement in higher education. Despite challenges such as aligning curriculum preferences, navigating administrative tasks, and accommodating visa regulations, both institutions have demonstrated a commitment to providing students with a comprehensive and innovative educational experience.

By alternating between the two institutes and integrating subjects from both curricula, students benefit from a well-rounded education that encompasses diverse perspectives and addresses industry needs. The emphasis on Industry 4.0, digitalization, and software usage ensures that graduates are equipped with the skills and knowledge required to excel in the modern logistics landscape.

Overall, the double degree program not only enhances the academic offerings of both institutions but also fosters international collaboration and prepares students for success in the global logistics industry. Through dedication, cooperation, and forward-thinking initiatives, KSTU and UM have set a precedent for effective cross-border education partnerships and interdisciplinary learning opportunities.

ACKNOWLEDGEMENTS

“Project no. 2019-2.1.11-TÉT-2020-00198 has been implemented with the support provided by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the 2019-2.1.11-TÉT funding scheme.”

REFERENCES

- [1] Illés B., Varga A. K. & Czap L. (2018). Logistics and digitization. *Vehicle and Automotive Engineering* 2, 220-225, https://doi.org/10.1007/978-3-319-75677-6_18
- [2] Dobos, P., Cservenák, Á., Skapinyecz, R., Illés, B. & Tamás, P. (2021). Development of an Industry 4.0-Based Analytical Method for the Value Stream Centered Optimization of Demand-

- Driven Warehousing Systems. *Sustainability* **13**(21), 11914, <https://doi.org/10.3390/su132111914>
- [3] Gravier, M. J. & Theodore Farris, M. (2008). An analysis of logistics pedagogical literature: past and future trends in curriculum, content, and pedagogy. *The International Journal of Logistics Management* **19**(2), 233-253. <https://doi.org/10.1108/09574090810895979>
- [4] Grabara J. K. & Kot S. (2001). New tools of engineering education for logistics training. In *Proceedings of the International Conference on Engineering Education*. 7-4.
- [5] Sun, L. & Song, G. (2018). Current state and future potential of logistics and supply chain education: a literature review. *Journal of International Education in Business* **11**(2), 124-143, <https://doi.org/10.1108/JIEB-10-2017-0039>
- [6] Fernos Y., Shkolnyi O. & Verniuk N. (2016). Collaborative Teaching and Learning in Logistics Education. In Wach, A. M. & Muffoletto, R.: *Perspectives on Computer Gaming in Higher Education* 61-68, Retrieved from https://www.researchgate.net/publication/312033275_Perspectives_on_Computer_Gaming_in_Higher_Education
- [7] Sheffi Y. (2010). Logistics intensive clusters. *Época/Epoch* **20**(1-2), 11-17.
- [8] *Double Degree in Supply Chain Management with Tilburg*. Retrieved from <https://www.luiss.edu/international-programs/double-degrees/tilburg-supply-chain> (accessed: 10 March 2024)
- [9] Woschank, M. & Pacher, C. (2020), A holistic didactical approach for industrial logistics engineering education in the LOGILAB at the Montanuniversitaet Leoben. *Procedia Manufacturing* **51**, 1814-1818, <https://doi.org/10.1016/j.promfg.2020.10.252>
- [10] Bányai, Á. (2010). Logistics engineering education from the point of view environment. In *EGU General Assembly Conference Abstracts* 3032.
- [11] Bányai, T., Illés, B., Landschützer, C., Schenk, F. & Massi, F. (2018). Cooperation in logistics technology research: how twinning project affects R+ D in the field of logistic systems and networks. *Advanced Logistic Systems-Theory and Practice* **12**(1), 21-36, <https://doi.org/10.32971/als.2019.002>
- [12] *Development of a Bologna-based Master Curriculum in Resource Efficient Production Logistics (ProdLog)*. Retrieved from <https://forschung-sachsen-anhalt.de/project/development-bologna-based-master-curriculum-21209> (accessed: 10 March 2024)
- [13] Senkevics, A. S., Carvalhaes, F., Ribeiro, C. C. & Barbosa, R. J. (2023). Double disadvantage: institutional structure and compensatory advantages in Brazilian higher education. <https://doi.org/10.31219/osf.io/yt2xk>