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Logistics engineering education from the point of view environment

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A new field of MSc programme offered by the Faculty of Mechanical Engineering and Informatics of the University of Miskolc is represented by the programme in logistics engineering. The Faculty has always laid great emphasis on assigning processes connected with environment protection and globalisation issues the appropriate weight in its programmes. This is based on the fact that the Faculty has initiated and been involved in a great number of research and development projects with a substantial emphasis on the fundamental principles of sustainable development.
The objective of the programme of logistics engineering is to train engineers who, in possession of the science, engineering, economic, informatics and industrial, transportation technological knowledge related to the professional field of logistics, are able to analyse, design, organise, and control logistics processes and systems (freight transportation, materials handling, storage, commissioning, loading, purchasing, distribution and waste management) as well as to design and develop machinery and equipment as the elements of logistic systems and also to be involved in their manufacture and quality control and are able to control their operation. The programme prepares its students for performing the logistics management tasks in a company, for creative participation in solving research and development problems in logistics and for pursuing logistics studies in doctoral programmes.
There are several laboratories available for practice-oriented training. The 'Integrated Logistics Laboratory' consists of various fixed and mobile, real industrial, i.e. not model-level equipment, the integration of which in one system facilitates not only the presentation, examination and development of the individual self-standing facilities, but the study of their interaction as well in terms of mechatronics, engineering, control engineering, informatics, identification technology and logistics. The state-of-the-art, reliable, automated mechatronics-material flow system with its single control engineering system provides the academic staff with up-to-date research facilities, and enables the students to study sophisticated equipment and systems that could also operate under industrial conditions, thus offering knowledge that can be efficiently utilised in the industry after graduation. The laboratory measurements of the programme in logistics engineering are performed in this laboratory, and they are supplemented by the theoretical and practical measurements in the 'Robotic Technology Assembly Laboratory', the 'Power Electronics Laboratory', the 'Mechatronics Laboratory', the 'CAD/CAM Laboratory' and the 'Acoustics and Product Laboratory'. The bodies of knowledge connected with environment protection and sustainable development can be grouped around three large topic areas.
In environmental economics the objective is to present the corporate-organisational aspects of environmental management. Putting environmental management in the focal point, the objective of the programme is to impart knowledge that can be utilised in practice which can be used to shift the relation between the organisation and its environment in the direction of sustainability. The tools include environmental controlling, environmental marketing and various solutions of environmental performance evaluation.
The second large topic area is globalization and its logistic aspects. In the field of global logistics the following knowledge carries special weight: logistic challenges in a globalised world; the concept of global logistics, its conditions and effects; delayed manufacture, assembly, packaging; the economic investigation of delayed assembly; globalised purchase and distribution in logistics; the logistic features of the globalised production supply/distribution chain; meta-logistics systems; logistics-related EU harmonisation issues; the effect of e-commerce on the global logistic system; logistic centres, connecting virtual logistic companies in a network; the environmental harmonisation of international transportation.
The third large area is recycling logistics. Here the bodies of knowledge are as follows: the concept of developing a 'closed-loop economy'; stages in the progress of products after discarding, connections between the uses of waste collection, processing, selection, deposition or reuse processes; features of European recommendations (e.g.

EMAS), harmonisation of national practices and global solutions; presenting the logistics part-processes of recycling; presenting process organisation procedures for the foundation of designing one-route, multi-route, replacement container waste collecting and distributing part systems; recycling strategies with consideration of logistically serving the separation and storage of waste to be deposited, the technological processing systems of recyclable materials; presenting dismantling and product and material identification technologies, presenting logistics part-tasks, analysis of technical solutions; IT solutions for identifying products and their elements to be distributed and withdrawn from distribution after use (e.g. RFID systems) and monitoring their material flow; methodology of using efficiency analyses and incentive systems in the decision making processes of recycling processes, risk analysis for evaluating typical part processes; the methodology of recycling-oriented product design for specific product groups.

Graduates of the Master programmes are able to use and utilise the knowledge obtained in practice, use problem-solving techniques; process the information, new problems and new phenomena arising in the border areas of the professional experience gained the discipline; formulate substantial criticism and opinions as far as possible, make decisions and draw conclusions; comprehending and solving the problems arising, suggesting original ideas; plan and perform tasks independently at a high professional standard; improve themselves, develop their knowledge to higher levels; view the management of technical/engineering – economic – human resources in a complex way; design complex systems in a global way based on a system-oriented and process-oriented way of thinking; use integrated knowledge from the professional fields of transport, mobile machinery, process theory, industrial production processes, electronics and informatics; combine the part processes of logistics systems and the part units performing their physical realisation (materials handling equipment, sensors, actuators, control systems, and database systems, etc.); perform state evaluations depending on their specialisation, use them to elaborate evaluations and recommendations, develop complex logistic systems, design, organise and control them at the highest level.

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