

**Application form for research topics
in the field of engineering and technology
for candidates to the Doctoral School
in the academic year 2025/6**

Proposed subject matter of a doctorate
Modelling systems in selected areas of transport and logistics
Scientific discipline
CIVIL ENGINEERING, GEODESY AND TRANSPORT
Proposed doctoral thesis supervisor
dr hab. inż. Norbert Chamier-Gliszczyński, prof. PK Faculty of Economics Sciences Street Kwiatkowskiego 6E; building A; room 414 e-mail: norbert.chamier-gliszczyński@tu.koszalin.pl, tel. : (+48) 94 34 39 182
Brief description of the research topics with an indication of the scientific issues (max. 350 words)
<p>A system is a collection of elements and processes organised to achieve a common goal. It has a variety of inputs that go through a specific process and takes into account the distortions that occur in order to produce outputs that collectively achieve the system's desired goal. There are a considerable number of systems, which are subdivided on the basis of the criteria adopted. One of them is the division according to the discipline of application of systems, in which we can distinguish, among others: transport systems, computer systems, social systems and many others. In terms of the research topic, the transport system will be analysed, defined as the combination of elements and their interactions that create demand for movement and the provision of transport services to satisfy this demand. The specific structure of a system is defined by the problem (or class of problems) for the solution of which it is used, so transport systems, like the systems themselves, can be divided into a number of criteria and types. Among other things, we can distinguish between intra-company transport systems, which belong to short-distance transport. They comprise the areas of storage and production transport, which includes station and inter-station transport. The in-plant transport system is one of the main areas of company activity that has been highly automated in recent years and refers to the idea of Industry 4.0, or Industry 5.0. The use of autonomous forklift trucks to move stock between workstations or the use of conveyors at production workstations greatly speeds up work and makes it safer. However, in order to automate transport in the plant or to modernise existing solutions, a systematic approach is required, i.e. building a model of the transport system and formulating a research method. An analysis of the factors determining solutions in the transport sphere is therefore necessary. Such a system could therefore be complemented by artificial intelligence tools.</p>

Justification of the purposefulness of taking up the research topics (max. 150 words)
The modelling of systems in selected areas of transport and logistics is an important element of the conducted scientific research. This research includes mathematical modelling and implementation of simulation studies using specialized computer tools (Matlab, FlexSim), or artificial intelligence tools. In practical terms, the analysed research issues fit into the concept of Economy 4.0. Literature research indicates that modelling, simulation of specified systems in the analysed areas of the economy constitute the basis for further development of the concepts of Industry 4.0, Logistics 4.0 and Mobility 4.0. It is therefore necessary to undertake scientific research in this area.
Proposed topics of doctoral theses within the proposed research subject matter (up to 3 topics)
<ol style="list-style-type: none"> 1. A support system for managing autonomous plant transport for the needs of intelligent production cells. 2. Assessment of the functioning of the transport system taking into account the assumptions of electromobility. 3. Simulation of logistics processes using intelligent IT tools.
The sources of financing of the research topics (the subject matter of currently implemented research grants financed from external sources or as part of subsidies)
Financing from Koszalin University of Technology projects and external grants.
Confirmation of the possibility of ensuring access to scientific apparatus and software necessary for the realization of the proposed research topics
Fully
If the answer is PARTIALLY or NONE please indicate a type of missing scientific apparatus and/or software and the sources of financing an access to them
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List of the supervisor's scientific achievements in the field of indicated scientific problems
A list of up to 5 major supervisor's publications related to the proposed research topics, published in journals indexed in the Web of Science or Scopus for the period of the last 3 years (taking into account the IF Impact Factor and the MNiSW score)
<ol style="list-style-type: none"> 1. Chamier-Gliszczyński, N., Wyszomirski, A., Balewski, C., Kłodawski, M. Green Public Transport in Poland—Planning the Process of the Electrification of the Bus Fleet of Vehicles. <i>Energies</i>, 2024, 17(24), 6362. https://doi.org/10.3390/en17246362, (IF = 3.0, 140 pkt.). 2. Kłodawski, M., Jachimowski, R., Chamier-Gliszczyński, N. Analysis of the Overhead Crane Energy Consumption Using Different Container Loading Strategies in Urban Logistics Hubs. <i>Energies</i>, 2024, 17(5), 985. https://doi.org/10.3390/en17050985, (IF = 3.0, 140 pkt.). 3. Staniuk W., Staniuk M., Chamier-Gliszczyński N., Jacyna M., Kłodawski M. Decision-Making under the Risk, Uncertainty and COVID-19 Pandemic Conditions Applying the PL9A Method of Logistics Planning-Case Study. <i>Energies</i>, 2022, 15(2), 639, https://doi.org/10.3390/en15020639, (IF = 3.0, 140 pkt.). 4. Fiuk J., Chamier-Gliszczyński N., Jacyna M., Izdebski M., Energy Efficiency of Transport Tasks Performed by the Air SAR System in the Baltic Sea: Case Study. <i>Energies</i>, 2022, 15(2), 643, https://doi.org/10.3390/en15020643, (IF = 3.0, 140 pkt.). 5. Szajna A., Stryjski R., Woźniak W., Chamier-Gliszczyński N., Kostrzewski M., Assessment of Augmented Reality in Manual Wiring Production Process with Use of Mobile AR Glasses. <i>Sensors</i>, ISSN 1424-8220, 20(17), 2020, 4755. (IF = 3.4, 100 pkt.).

A list of research grants financed by the National Science Centre, the National Centre of Research and Development and the European Research Council in which the supervisor has participated during the last 5 years

1. Grant under the Social Responsibility of Science/Excellent Science programme, deadline 2022. Project title: Economy 4.0, Industry 4.0, Logistics 4.0, Mobility 4.0, Open to the future and the world.

A list of research services provided for industry related to the proposed research topics for the period of the last 5 years

1. Development of an opinion on innovativeness in the field of warehouse logistics for Hurtel Sp. z o.o., Zielona Góra.
2. Development of an opinion on modelling logistics processes for Electrecity Sp. z o.o., Wrocław.