Application form for research topics in the field of engineering and technology for candidates to the Doctoral School in the academic year 2024/2025

Proposed subject matter of a doctorate
Analyze the process of land deforestation and land conversion, and forecast changes in land use for other purposes
Scientific discipline (delete as appropriate)
~~AUTOMATION, ELECTRONICS AND ELECTRICAL ENGINEERING~~ CIVIL ENGINEERING, GEODESY AND TRANSPORT ~~MECHANICAL ENGINEERING~~
Proposed doctoral thesis supervisors
1. dr hab. inż. Krystyna Kurowska, prof. UWM University of Warmia and Mazury in Olsztyn, Faculty of Geoengineering; Department of Land Management 10-720 Olsztyn, Street Prawocheńskiego 15; building P15; room 104 e-mail: krystyna.kurowska@uwm.edu.pl; phone.: 89 523 42 81 2. dr hab. inż. Marcin Jagoda, prof. PK Faculty of Civil Engineering, Environment and Geodesy; Department of Geodesy and Geoinformatics Street Śniadeckich 2; building E; room 212-9 e-mail: marcin.jagoda@tu.koszalin.pl ; phone.: 94 34 86 752

Brief description of the research topics with an indication of the scientific issues (max. 350 words)
Over the years, the legal regulations governing the principles of protection of agricultural and forest land have changed. In connection with the inevitable development and demand for new investment areas, there is a risk of losing agricultural land of high production value and forest land for other functions (residential, service, industrial and other). The main objective of the research will be to develop a conversion loss index (CLI) for other purposes, the result of which will be thematic maps illustrating the scale of the phenomena discussed. One of the stages of the research will be to assess the scale of the inclusion of agricultural and forest land for investment purposes in an attractive area, characterized by high landscape and environmental values (obtained consents for change of destination in the local spatial development plan and issued decisions on excluding agricultural and forest land from agricultural and forestry production). A key stage of the research will be the development of an algorithm (CLI) for the needs of spatial

policy shaping and determining the demand for new investment areas in the long term. The research will be based on theoretical foundations (literature review) and formal and legal aspects (analysis of legal regulations governing the process of protection of agricultural and forest land in the investment and construction process) in changing socio-economic conditions and spatial analyzes based on spatial data. For the needs of spatial analyzes, GUS data, commune's and poviat's registers, industry portals (Geoportal, SIP) and satellite data (Copernicus) will also be used.

The implementation of the research aims to indicate the possibility of using the proposed indicator (CLI) in the spatial planning process, as an instrument enabling rational spatial development in accordance with the principles of sustainable development.

Justification of the purposefulness of taking up the research topics (max. 150 words)

Rational management of agricultural and forest land is one of the tasks of land use planning. In turn, the need to preserve agricultural and forest land is mainly due to the ongoing growth of the population and meeting its needs for food, housing, work and recreation. Thus, it involves the need for new investment areas, but also the preservation of areas for agricultural production and forests. An integral process in the development of the residential sector and industry and services is the change of use of agricultural and forest land for other purposes. To rationally manage space, it is necessary to monitor changes in space and support decision-making processes with algorithms aimed at selecting the most optimal approach to the formation of spatial policy and land use. Relatively few studies focus on policies for the protection of agricultural and forest land and the implementation of these policies at the local level both in Poland and internationally. An important aspect of the research is also the changes to the spatial planning system in Poland and the new challenges and risks of spatial development planning that will come into force after the transition period, i.e. from 2026.

Proposed topics of doctoral theses within the proposed research subject matter (up to 3 topics)

Develop a conversion loss index (CLI) for other purposes

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)

As part of the subvention

Confirmation of the possibility of ensuring access to scientific apparatus and software necessary for the realization of the proposed research topics (delete as appropriate)

FULLY/ ~~PARTLY / NONE~~

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

Not applicable

List of scientific achievements of the supervisor in the topics of the 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)

1. Kurowska, K., Kryszk, H., Marks-Bielska, R., Mika, M., & Leń, P. (2020). Conversion of agricultural and forest land to other purposes in the context of land protection: Evidence from Polish experience. Land use Policy, 95, 104614. (IF= 5.398, 140 pkt)
2. Kurowska, K., Marks-Bielska, R., Bielski, S., Aleknavičius, A., & Kowalczyk, C. (2020).

Geographic information systems and the sustainable development of rural areas. Land, 10(1), 6. (IF= 3.900, 70 pkt)

3. Kurowska, K., Adamska-Kmieć, D., Kowalczyk, C., & Leń, P. (2021). Communication value of urban space in the urban planning process on the example of a Polish city. Cities, 116, 103282. (IF= 6.077, 100 pkt)
4. Korolov, V., Kurowska, K., Korolova, O., Zaiets, Y., Milkovich, I., & Kryszk, H. (2021). Methodology for determining the nearest destinations for the evacuation of people and equipment from a disaster area to a safe area. Remote Sensing, 13(11), 2170. (IF= 5.349, 100 pkt)
5. Kurowska, K., & Kowalczyk, C. (2022). Rural Space Modeling—Contemporary Challenges. Land, 11(2), 173. (IF= 3.900, 70 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

N/A

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

N/A