

ADMISSION TO DOCTORAL STUDIES

Session September 2026

Field of doctoral studies: Electrical Engineering

Doctoral supervisor: Prof. Ioan Serban

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Machine Learning-Based Intelligent Control of Inverters in Microgrids*

Contents / Main aspects to be considered:

- microgrid hardware configuration analysis;
- control of parallel inverters in a microgrid;
- implementation of advanced control strategies integrating machine learning techniques;
- modelling and simulation of the microgrid (hardware and control);
- development and laboratory validation of an experimental model;

Recommended bibliography:

- [1] M. S. Eslahi and S. Vaez-Zadeh, "Resilient Control of Converter-Based Microgrids Enhanced by Deep Learning," in *IEEE Transactions on Industrial Electronics*, vol. 72, no. 10, pp. 10153-10165, Oct. 2025, doi: 10.1109/TIE.2025.3552183.
- [2] I. Serban, S. Céspedes, C. Marinescu, C. A. Azurdia-Meza, J. S. Gómez and D. S. Hueichapan, "Communication Requirements in Microgrids: A Practical Survey," in *IEEE Access*, vol. 8, pp. 47694-47712, 2020.
- [3] E. Mohammadi, M. Alizadeh, M. Asgarimoghaddam, X. Wang and M. G. Simões, "A Review on Application of Artificial Intelligence Techniques in Microgrids," in *IEEE Journal of Emerging and Selected Topics in Industrial Electronics*, vol. 3, no. 4, pp. 878-890, Oct. 2022.
- [4] S. Zhao, F. Blaabjerg and H. Wang, "An Overview of Artificial Intelligence Applications for Power Electronics," in *IEEE Transactions on Power Electronics*, vol. 36, no. 4, pp. 4633-4658, April 2021.

Prerequisites / Remarks:

- Bachelor's degree and/or master's degree in electrical engineering or in a similar domain;
- Good command of English;
- Programming skills (e.g. Python, Matlab)

Scientific Doctorate

Professional Doctorate

without tuition fee (state budget funded)

with tuition fee or with funding from other sources than the state budget

Doctoral supervisor,

Coordinator of the field of doctoral studies,

Prof. Dr. Ing. SERBAN Ioan

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Signature

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