



ADMISSION TO DOCTORAL STUDIES

Session September 2024

Field of doctoral studies: Electronics engineering, telecommunications, and information technologies

Doctoral supervisor: Prof. Dr. Petru A. COTFS

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Energy harvesting systems applicable in the medical field*

Contents / Main aspects to be considered –

Energy harvesting systems (photovoltaic, thermoelectric, piezoelectric, radio frequency, ...);
Embedded systems with applicability in medicine;
IoT and Low power sensors used in medicine;
Virtual Instrumentation.

Recommended bibliography:

1. P. Adrian Cotfas, D. Tudor Cotfas, and H. Hedesiu, 'Virtual Instrumentation Used in Renewable Energy', LabVIEW - Virtual Instrumentation in Education and Industry. IntechOpen, Mar. 06, 2023. doi: 10.5772/intechopen.110298.
2. Jiming Chen et al., Rechargeable Sensor Networks: Technology, Theory, and Application - Introducing Energy Harvesting to Sensor Networks, World Scientific, 2014, ISBN: 978-981-4525-45-9;
3. Christopher Siu, Krzysztof Iniewski, IoT and Low-Power Wireless Circuits, Architectures, and Techniques, 2nd edition, CRC Press, 2018;
4. Ran He, Gabi Schierning, Kornelius Nielsch, Thermoelectric Devices: A Review of Devices, Architectures, and Contact Optimization, Advanced Materials Technologies, 2018, 3, 1700256;
5. MA Zoui et al, A Review on Thermoelectric Generators: Progress and Applications, Energies 2020, 13(14);
6. P. Cotfas, D. T. Cotfas, D. Ursuțiu, C. Samoilă, NI ELVIS Computer-Based Instrumentation, NTS PRESS (National Technology and Science Press), USA Allendale, NJ 07401, 2012 (ISBN 978-1-934891-11-7)
(<https://education.ni.com/teach/resources/87/ni-elvis-computer-based-instrumentation>).

Prerequisites / Remarks:

Knowledge of renewable energies, applied electronics in energy harvesting and virtual instrumentation

Scientific Doctorate (full-time only)

Professional Doctorate – in the fields of Music and Science of sport and physical education (full-time or part-time)

without tuition fee (state budget funded)

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

TOPIC 2: *Embedded systems applied in the characterization of renewable energy sources in concentrated light*

Contents / Main aspects to be considered –

Embedded systems and technologies, IoT type, applied in concentrated light systems;
Intelligent systems for the characterization and monitoring of renewable energy sources;
Artificial intelligence and machine learning applied in data processing for the characterization of renewable energy sources.

Recommended bibliography:

1. P. Adrian Cotfas, D. Tudor Cotfas, and H. Hedesiu, 'Virtual Instrumentation Used in Renewable Energy', LabVIEW - Virtual Instrumentation in Education and Industry. IntechOpen, Mar. 06, 2023. doi: 10.5772/intechopen.110298.
2. Cotfas, P.A.; Cotfas, D.T. Comprehensive Review of Methods and Instruments for Photovoltaic–Thermoelectric Generator Hybrid System Characterization. *Energies* 2020, 13, 6045.
3. S. Mahmoudinezhad, S. Ahmadi Atouei, P.A. Cotfas, D.T. Cotfas, L.A. Rosendahl, A. Rezania, Experimental and numerical study on the transient behavior of multi-junction solar cell-thermoelectric generator hybrid system, *Energy Conversion and Management*, Vol. 184, 2019.
4. P.A. Cotfas, D.T. Cotfas: Design and implementation of RELab system to study the solar and wind energy, *Measurement* 93, 94-101, 2016.
5. Einar Krogh, *An Introduction to the Internet of Things*, Bookboon, 2020.
6. Mansaf Alam, Kashish Ara Shakil, Samiya Khan, *Internet of Things (IoT)*, Springer, 2019.
7. Laurence Moroney, *AI and Machine Learning for Coders*, O'Reilly Media, Inc, 2020.
8. D.T. Cotfas, "Celule fotovoltaice" Ed. Univ."Transilvania" Brasov, 2010.

Prerequisites / Remarks: Knowledge of renewable energies, applied electronics in the characterization of renewable energy sources and virtual instrumentation

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Doctoral supervisor,

Prof. Dr. Petru A. COTFAS

Signature

Coordinator of the field of doctoral studies,

Prof. Dr. Ing. Mihai IVANOVICI

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