Transilvania University of Brașov
INTERDISCIPLINARY DOCTORAL SCHOOL

ADMISSION TO DOCTORAL STUDIES **Session September 2025**

Field of doctoral studies: Mechanical Engineering
Doctoral supervisor: prof. dr. Cătălin ALEXANDRU

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: Increasing the comfort, stability and manoeuvrability of road vehicles
Content / Main aspects to be considered - vehicle dynamics, suspension & steering systems (including active/semi-active suspension & 4-wheel steering), 3D modelling, simulation in a virtual prototyping environment, multi-criteria optimization
Recommended bibliography: ▪ Alexandru, C., Pozna, C. Dinamica sistemelor mecanice pe baza prototipării virtuale cu aplicare la mecanismele suspensiei vehiculelor. Editura Universității Transilvania din Braşov, 2003 ▪ Alexandru, C. Virtual prototyping platform for designing mechanical and mechatronic systems. Product Design, IntechOpen, 2021 ▪ Alexandru, P., Vişa, I., Talabă, D., Alexandru, C., Antonya, C. Modelarea statico-dinamică a mecanismelor de ghidare ale roților automobilelor. Lux Libris, Brașov, 2005 ▪ Untaru, M., et al. Dinamica autovehiculelor. Editura Universității Transilvania din Braşov, 1988
Prerequisites / Remarks: knowledge of virtual prototyping software solutions (CAD/MBS/FEA/DFC) is required
☑ **Scientific Doctorate (full-time only)** ☐ **Professional Doctorate (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: Increasing the efficiency of solar tracking systems
Content / Main aspects to be considered - types of solar tracking systems, solar radiation modelling, 3D modelling, simulation in a virtual prototyping environment, multi-criteria optimization, control strategies/systems
Recommended bibliography: ▪ Alexandru, C., Pozna, C. The analysis and optimization in virtual environment of the

mechatronic tracking systems used for improving the photovoltaic conversion. Motion Control, IntechOpen, 2010
- Alexandru, C. Virtual prototyping platform for designing mechanical and mechatronic systems. Product Design, IntechOpen, 2021
- Dorf, R.C., Bishop, R.H. Modern control systems. Pearson, 2016
- Vișa, I. , et al. The role of mechanisms in sustainable energy systems. Editura Universității Transilvania din Braşov, 2015

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Doctoral supervisor,

Prof. dr. ing. Cătălin ALEXANDRU

Signature

Coordinator of the field of doctoral studies,

Prof. dr. ing. Maria Luminița SCUTARU

Signature