Transilvania University of Brașov
INTERDISCIPLINARY DOCTORAL SCHOOL

ADMISSION TO DOCTORAL STUDIES **Session September 2026**

Field of doctoral studies: Industrial Engineering
Doctoral supervisor: Prof. Dr. habil. eng. Dorin-Ioan CATANA

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Researches regarding the optimization of the work places by using wearable sensors*
Contents / Main aspects to be considered - the use of wearable sensors allows the monitoring of the movements performed by the employee at work. The analysis of the collected data, their processing and optimization as well as the integration of the human factor in the planning stages, design and validation of the product life cycle, will lead to the obtaining of ergonomic and productive jobs.
Recommended bibliography: 1. Cătană D. – Evaluarea riscului în securitatea şi sănătatea ocupa ională, Editura Lux Libris, Braşov, 2013 2. Darabon A., s.a. – Managementul securită ii şi sănătă ii în muncă, Vol. 1, Editura AGIR, Bucureşti, 2001 3. Darabon A., s.a. – Managementul securită ii şi sănătă ii în muncă, Vol. 2, Editura AGIR, Bucureşti, 2001
Prerequisites / Remarks: bachelor's and master's degree in Industrial engineering, Medicine or Mechanical engineering, knowledge of the human modeling and simulation tools
☒ **Scientific Doctorate** ☒ **Professional Doctorate**
☒ **without tuition fee (state budget funded)** ☒ **with tuition fee or with funding from other sources than the state budget**

TOPIC 2: *Researches regarding the increasing of the alloy steels performances, 3D printed*
Contents / Main aspects to be considered - 3D printing is the solution for many practical problems. The applying of the some adequate post-processing techniques allows the improving of the mechanical properties for the titanium alloy structures, 3D printed
Recommended bibliography: 1. Berce P., s.a. – Fabricarea rapidă a prototipurilor, Editura Tehnică, Bucureşti, 2000

2. Gregory I., s.a. – 3D-Printed mechanochromic materials, Applied Materials & Interfaces, Vol. 7 (1), 2015, pp. 577-583
3. Hofmann M.. s.a. – 3D Printing gets a boost and opportunities with polymer materials, Macro Letters, Vol. 3, 2014, pp. 382– 386
4. Bakarich S. E. s.a. – Three-dimensional printing fiber reinforced hydrogel composites, Applied Materials & Interfaces, Vol. 6, 2014, pp. 15998– 16006
5. Ruiz-Morales JC, s.a – Three dimensional printing of components and functional devices for energy and environmental applications, Energy & Environmental Science, Vol. 10, 2017, pp. 846-859

Prerequisites / Remarks: bachelor's and master's degree in Industrial engineering or Mechanical engineering; knowledge of the additive processing and investigation of the mechanical properties; knowledge of the numerical modeling and simulation tools

☒ **Scientific Doctorate**

☒ **Professional Doctorate**

☒ **without tuition fee (state budget funded)**

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

TOPIC 3: *Researches regarding the increasing of the ceramic material performances, 3D printed*

Contents / Main aspects to be considered - 3D printing is the solution for many practical problems. The establishing of the mechanical and technological properties for ceramic materials printed by the FDM process, will allow the optimization of designed parts by applying finite element analysis.

Recommended bibliography:

1. Berce P., s.a. – Fabricarea rapidă a prototipurilor, Editura Tehnică, Bucureşti, 2000
2. Gregory I., s.a. – 3D-Printed mechanochromic materials, Applied Materials & Interfaces, Vol. 7 (1), 2015, pp. 577-583
3. Hofmann M.. s.a. – 3D Printing gets a boost and opportunities with polymer materials, Macro Letters, Vol. 3, 2014, pp. 382– 386
4. Bakarich S. E. s.a. – Three-dimensional printing fiber reinforced hydrogel composites, Applied Materials & Interfaces, Vol. 6, 2014, pp. 15998– 16006
5. Ruiz-Morales JC, s.a – Three dimensional printing of components and functional devices for energy and environmental applications, Energy & Environmental Science, Vol. 10, 2017, pp. 846-859
6. Catana D-I, Pop M-A – Studies regarding simulation process to static loading of the structures obtained from polylactic acid, 3D printed, Journal of Applied Polymer Science, V, February, 50036, 2021
7. Catana D-I, s.a. – Comparison between the test and simulation results for PLA structures3D printed, bending stressed, Molecules, Volume 26, Issue 11, 3325, 2021olume 138, Issue 6

Prerequisites / Remarks: bachelor's and master's degree in Industrial engineering or Mechanical engineering, knowledge of CAD-CAE (simulation) tools
☒ **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,

Prof. Dr. eng. Dorin-Ioan. Catana

Signature

Coordinator of the field of doctoral studies,

Prof. Dr. Eng. Gheorghe Oancea

Signature