

## ADMISSION TO DOCTORAL STUDIES

Session September 2025

**Field of doctoral studies: Mechanical Engineering**

**Doctoral supervisor: prof. Silviu Butnariu**

### TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

#### **TOPIC 1:** *Studies on the level of passive security of the vehicle after an accident*

##### **Contents / Main aspects to be considered –**

Strategies for scanning, segmentation and modeling of surface-type bodies (vehicle body elements).  
Analysis of plastic deformations under the action of dynamic loads.  
Analysis of repair methods for plastically deformed elements.  
Analysis of body plasticity and coefficient of restitution.

##### **Recommended bibliography:**

1. Butnariu S., Analysis of mechanical structures using finite element method, lecture notes, ISBN 978-606-19-0311-5 (CD), Ed. Universitatii Transilvania din Brasov, 2013
2. Butnariu, S., Mogan, Gh., Analiza cu elemente finite în ingineria mecanică.. Aplicatii practice in ANSYS, Ed. Universităţii Transilvania, ISBN 978-606-19-0474-7 (print), 2014
3. Butnariu, S., VR technologies for scanning, 3D reconstruction and tracking-lecture notes, CD, ISBN: 978-973-131-340-5, Ed. Lux Libris, 2016
4. Hadryś, D., and M. Miros, Coefficient of restitution of model repaired car body parts. Journal of Achievements in Material and Manufacturing Engineering 28.1 (2008): 51-54.
5. Schuh, Benjamin, et al. Mechanical properties, microstructure and thermal stability of a nanocrystalline CoCrFeMnNi high-entropy alloy after severe plastic deformation. Acta Materialia 96 (2015): 258-268.
6. Lee, Erastus H. "Elastic-plastic deformation at finite strains." (1969): 1-6.
7. Navodariu, Nicolae, et al. Effect of local heating on the mechanical characteristics of repaired automotive panels. Materiale Plastice 56.4 (2019): 750-758.
8. Chen, Chao, et al. "Research on the mechanical properties of repaired clinched joints with different forces." Thin-Walled Structures 152 (2020): 106752.
9. Mori, Ken-ichiro, et al. "Joining by plastic deformation." CIRP Annals 62.2 (2013): 673-694

##### **Prerequisites / Remarks:**

Graduates of the Automotive Engineering, Mechanical Engineering, Medical Engineering, Mechatronics, Robotics, Electrical Engineering study programs; Programming knowledge

☒ **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**

**Doctoral supervisor,**

Prof. Dr. eng. Silviu BUTNARIU

Signature

**Coordinator of the field of doctoral studies,**

Prof. Dr. Eng. Maria Luminita SCUTARU

Signature