

ADMISSION TO DOCTORAL STUDIES

Session September 2026

Field of doctoral studies: Materials engineering

Doctoral supervisor: Prof. dr. eng. Mircea Horia Țierean

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

<p>TOPIC 1: <i>Research on the application of laser texturing of metal surfaces to medical devices</i></p>
<p>Contents / Main aspects to be considered</p> <ul style="list-style-type: none"> • Current state of the art of laser texturing. • Obtaining laser textured surfaces for medical devices. • Characterization of textured medical device surfaces (optical microscopy, SEM, roughness, wetting and mechanical properties).
<p>Recommended bibliography:</p> <ol style="list-style-type: none"> 1. Chen, H.; Zhang, Y.; Zhang, L.; Ding, X.; Zhang, D. Applications of bioinspired approaches and challenges in medical devices. <i>Bio-Design and Manufacturing</i>, 2021, 4, 146-148, DOI: 10.1007/s42242-020-00103-6. 2. Du, X.; Liu Z.; Zhang, Z.; Du, C.; et al. Functional surfaces of medical devices based on laser processing: a review. <i>Diamond & Abrasives Engineering</i>, 2024, 44(2). 206-220, DOI:10.13394/j.cnki.jgszz.2023.0010. 3. Jaggessar, A.; Shahali, H.; Mathew, A.; Yarlagadda, P.K.D.V. Bio-mimicking nano- and micro-structured surface fabrication for antibacterial properties in medical implants. <i>Journal of Nanobiotechnology</i>, 2017, 15:64, 1-20, DOI: 10.1186/s12951-017-0306-1. 4. Li, C.; Yang, L.; Liu, N.; Yang, Y.; Zhao, J.; Yang, P.; Cheng, G. Bioinspired surface hierarchical microstructures of Ti6Al4V alloy with a positive effect on osteoconduction. <i>Surface and Coatings Technology</i>, 2020, 388, 125594, DOI: 10.1016/j.surfcoat.2020.125594. 5. Pou, P.; Riveiro, A.; del Val, J.; Comesana, R.; et al. Laser surface texturing of titanium for bioengineering applications. <i>Procedia Manufacturing</i>, 2017, 13, 694-701, DOI: 10.1016/j.promfg.2017.09.102. 6. Wang, H., Deng, D., Zhai, Z., Yao, Y., Laser-processed functional surface structures for multi-functional applications-a review, <i>Journal of Manufacturing Processes</i>, 2024, 116, 247-283, DOI: 10.1016/j.jmapro.2024.02.062. 7. Xu, Z.; Wang, Y.A.; Ng, V.; Yin, H.; Xu, S. Advancements in Laser-Processed Functional Surfaces for Medical Devices: A Current Review. <i>Nanomaterials</i>, 2025, 15, 999., DOI: 10.3390/nano15130999.
<p>Prerequisites / Remarks: <i>Graduate of a master's degree program in the field of Materials Engineering, Industrial Engineering, Mechanical Engineering, Environmental Engineering.</i></p>
<p><input checked="" type="checkbox"/> Scientific Doctorate</p>
<p><input checked="" type="checkbox"/> Professional Doctorate</p>
<p><input checked="" type="checkbox"/> without tuition fee (state budget funded)</p>
<p><input checked="" type="checkbox"/> with tuition fee or with funding from other sources than the state budget</p>

Doctoral supervisor,

Prof. dr. eng. Mircea Horia Țierean

Signature

Coordinator of the field of doctoral studies,

Prof. dr. eng. Mircea Horia Țierean

Signature