Transilvania University of Brașov
INTERDISCIPLINARY DOCTORAL SCHOOL

**ADMISSION TO DOCTORAL STUDIES** **Session September 2026**

**Field of doctoral studies: Materials Engineering**
**Doctoral supervisor: CS II dr. eng. Mihai Alin POP**

## TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

**TOPIC 1:** *Advanced Engineering Approaches for 3D Printing Applications of Polymeric Materials*

**Contents / Main aspects to be considered**

1. *State of the art regarding polymeric materials used in Additive Manufacturing*
2. *Engineering and selection of polymeric materials for 3D Printing*
3. *Material processing and preparation*
4. *Process engineering and optimization of 3D Printing parameters*
5. *Structural and microstructural characterization*
6. *Mechanical, thermal and functional characterization*
7. *Advanced engineering approaches for functional 3D Printed structures*
8. *Sustainability and circular economy approaches*
9. *Experimental research and case studies*
10. *Original contributions and scientific novelty*
11. *Conclusions and future research directions*

**Recommended bibliography:**


1. Gibson, I., Rosen, D., Stucker, B., Khorasani, M., Rosen, D., Stucker, B., & Khorasani, M. (2021). Additive manufacturing technologies (Vol. 17, pp. 160-186). Cham, Switzerland: Springer.
2. Bandyopadhyay, A., & Bose, S. (Eds.). (2019). *Additive manufacturing*. CRC press.
3. Rajasekar, R., Moganapriya, C., & Kumar, P. S. (Eds.). (2024). Additive manufacturing with novel materials: Process, properties and applications. John Wiley & Sons.
4. ASTM International. (2021). ASTM F2792/F42 Standards for Additive Manufacturing Technologies.


**Prerequisites / Remarks:** Graduate of a master's degree program in the field of Materials Engineering, Industrial Engineering, Mechanical Engineering, Environmental Engineering, Chemical Engineering.

☒ **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:** *Engineering, Processing, and Characterization of Composite Materials for Additive Manufacturing Applications*

**Contents / Main aspects to be considered**

1. *Introduction to Additive Manufacturing and Composite Materials*
2. *State of the Art in Composite Materials for Additive Manufacturing*
3. *Review of additive manufacturing technologies for composites: FDM/FFF, SLS, SLA, FGF.*
4. *Engineering of Composite Materials for Additive Manufacturing*
5. *Processing of Composite Materials for 3D Printing*
6. *Optimization of Additive Manufacturing Processes*
7. *Structural and Microstructural Characterization*
8. *Mechanical Characterization of 3D Printed Composite Materials*
9. *Thermal and Functional Characterization*
10. *Advanced Structures and Engineering Applications*
11. *Sustainability and Circular Economy Approaches*
12. *Experimental Research and Validation*
13. *Original Contributions and Scientific Novelty*
14. *Conclusions and Future Research Directions*

**Recommended bibliography:**


1. Touchard, F., & Sarasini, F. (Eds.). (2024). Additive Manufacturing of Polymer-based Composite Materials: Materials, Processes, and Properties. Elsevier.
2. Rajasekar, R., Moganapriya, C., & Kumar, P. S. (Eds.). (2024). Additive manufacturing with novel materials: Process, properties and applications. John Wiley & Sons.
3. Rangappa, S. M., Gupta, M. K., Siengchin, S., & Song, Q. (Eds.). (2021). Additive and subtractive manufacturing of composites (p. 247). Springer Singapore.
4. ASTM International. (2021). ASTM F2792/F42 Standards for Additive Manufacturing Technologies.


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**Doctoral supervisor,**

CS II. Dr. Eng. Mihai Alin Pop

Signature

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

Prof. Dr. Eng. Mircea Horia Țierean

Signature