Universitatea Transilvania din Brașov

ADMITERE DOCTORAT 2020-2021

Sesiunea Septembrie 2020

Școala Doctorală Interdisciplinară (SDI)

Domeniul de doctorat:
Ingineria Materialelor
Conducător doctorat:
Prof.dr.ing. Mircea Horia Țierean

TEME (TEMATICĂ) PENTRU CONCURS

TEMA 1: *Influența materialelor și a parametrilor tehnologici asupra proprietăților pieselor tipărite 3D prin extrudare*

Principalele aspecte abordate:

- *Caracterizarea structurală, mecanică, calorimetrică*
- *Determinarea porozității*
- *Caracterizarea biocompatibilității (penetrabilitatea microorganismelor, creșterea celulelor, dezinfecția)*

Bibliografie recomandată:

1. Anderson, E.H., The Effect of Porosity on Mechanical Properties of Fused Deposition Manufactured Polymers and Composites, 2019, Master's Theses. 4992, DOI: https://doi.org/10.31979/etd.rkaj-q4tv.
2. Carneiro, O.S., Silva A.F., Gomes, R., Fused deposition modeling with polypropylene, Materials & Design 83 (2015) 768–776.
3. Chacón, J.M., Caminero, M.A., García-Plaza, E. P., Núñez, J., Additive manufacturing of PLA structures using fused deposition modelling: Effect of process parameters on mechanical properties and their optimal selection, Materials and Design 124 (2017) 143–157.
4. Ferreira, R.T.L., Cardoso Amatte, I., Assis Dutra, T., Bürger, D., Experimental characterization and micrography of 3D printed PLA and PLA reinforced with short carbon fibers, Composites Part B 124 (2017) 88-100.
5. Gordeev, E.G., Galushko, A.S., Ananikov, V.P., Improvement of quality of 3D printed objects by elimination of microscopic structural defects in fused deposition modeling, 2018, https://doi.org/10.1371/journal.pone.0198370.
6. Liao, Y., Liu, C., Coppola, B., Barra, G., DiMaio, L., Incarnato, L., Lafdi, K., Effect of Porosity and Crystallinity on 3D Printed PLA Properties, 2019, Polymers 11(9):1487, DOI: 10.3390/polym11091487.
7. Song, Y., Li, Y., Song, W., Yee, K., Lee, K.-Y., Tagarielli, V.L., Measurements of the mechanical response of unidirectional 3D-printed PLA, Materials and Design 123 (2017) 154–164.
8. Srivastava, V.K., A Reviev on Advances in Rapid Prototype 3D Printing of Multi-Functional Applications, Science and Technology 2017, 7(1): 4-24, DOI: 10.5923/j.scit.20170701.02.

9. Tanikella, N.G., Wittbrodt, B., Pearce, J.M., Tensile strength of commercial polymer materials for fused filament fabrication 3D printing Additive Manufacturing 15 (2017) 40–47.
10. Zekavat, A R., Jansson, A., Larsson, J., Pejryd, L., Investigating the effect of fabrication temperature on mechanical properties of fused deposition modelling parts using X-ray computed tomography ,The International Journal of Advanced Manufacturing Technology, 2018, https://doi.org/10.1007/s00170-018-2664-8.
11. Introducere în imprimarea 3D, https://3d-p.eu/wp-content/uploads/2018/08/IO3_3DP-courseware_RO.pdf.

Precondiții: *Studii absolvite: Inginerie, Fizică, Chimie, Matematică, Informatică*

Conducător doctorat:

Prof.dr.ing. Mircea Horia Țierean

Transilvania University of Brasov

ADMISSION TO DOCTORAL STUDIES
2020-2021
Session September 2020

Interdisciplinary Doctoral School (SDI)

Field of doctoral studies:
Materials engineering
PhD supervisor:
Prof.dr.eng. Mircea Horia Țierean

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *The influence of materials and technological parameters on properties of 3D printed parts obtained by Fusion Deposition Modeling*

Main aspects to be considered:

- *Structural, mechanical, calorimetric characterization*
- *Porosity determination*
- *Characterization of biocompatibility (penetrability of microorganisms, cell growth, disinfection)*

Recommended bibliography:

1. Anderson, E.H., The Effect of Porosity on Mechanical Properties of Fused Deposition Manufactured Polymers and Composites, 2019, Master's Theses. 4992, DOI: https://doi.org/10.31979/etd.rkaj-q4tv.
2. Carneiro, O.S., Silva A.F., Gomes, R., Fused deposition modeling with polypropylene, Materials & Design 83 (2015) 768–776.
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4. Ferreira, R.T.L., Cardoso Amatte, I., Assis Dutra, T., Bürger, D., Experimental characterization and micrography of 3D printed PLA and PLA reinforced with short carbon fibers, Composites Part B 124 (2017) 88-100.
5. Gordeev, E.G., Galushko, A.S., Ananikov, V.P., Improvement of quality of 3D printed objects by elimination of microscopic structural defects in fused deposition modeling, 2018, https://doi.org/10.1371/journal.pone.0198370.
6. Liao, Y., Liu, C., Coppola, B., Barra, G., DiMaio, L., Incarnato, L., Lafdi, K., Effect of Porosity and Crystallinity on 3D Printed PLA Properties, 2019, Polymers 11(9):1487, DOI: 10.3390/polym11091487.
7. Song, Y., Li, Y., Song, W., Yee, K., Lee, K.-Y., Tagarielli, V.L., Measurements of the mechanical response of unidirectional 3D-printed PLA, Materials and Design 123 (2017) 154–164.

8. Srivastava, V.K., A Reviev on Advances in Rapid Prototype 3D Printing of Multi-Functional Applications, Science and Technology 2017, 7(1): 4-24, DOI: 10.5923/j.scit.20170701.02.
9. Tanikella, N.G., Wittbrodt, B., Pearce, J.M., Tensile strength of commercial polymer materials for fused filament fabrication 3D printing Additive Manufacturing 15 (2017) 40–47.
10. Zekavat, A R., Jansson, A., Larsson, J., Pejryd, L., Investigating the effect of fabrication temperature on mechanical properties of fused deposition modelling parts using X-ray computed tomography ,The International Journal of Advanced Manufacturing Technology, 2018, https://doi.org/10.1007/s00170-018-2664-8.
11. 3D printing basics, https://3d-p.eu/wp-content/uploads/2018/08/IO3_3DP-courseware_RO.pdf.

Prerequisites: *Graduation in: Engineering, Physics, Chemistry, Mathematics, Computer Science*

PhD supervisor:

Prof.dr.eng. Mircea Horia Țierean