

## I. Personal and study details

Student's name: **Celba Matouš** Personal ID number: **484040**  
Faculty / Institute: **Faculty of Mechanical Engineering**  
Department / Institute: **Department of Production Machines and Equipment**  
Study program: **Robotics and Production Machines**  
Specialisation: **Production Machines**

## II. Master's thesis details

Master's thesis title in English:

**Control of the Robotic LMD-w Process for Achieving Desired Structural Sizes**

Master's thesis title in Czech:

**ízení robotického LMD-w procesu pro dosažení požadované velikosti struktur**

Guidelines:

Scope of Work: The LMD-w process represents one of the standard AM (Additive Manufacturing) processes. One of the challenges in component production is the integration of laser source control, wire feeding, and robot path control to prevent material accumulation. Design, implementation, and practical validation of a control method for overlaying corrosion-resistant steel with feedback control. Thesis Outline: 1. Technological characterization of the LMD-w technology. 2. Overview of control methods for the LMD process with feedback on trajectory, motion speed, wire feed rate, and laser power. 3. Familiarization with existing functions in control for laser robotic cell LASCAM. Proposal of a control strategy. 4. Design of samples with typical path entities to demonstrate the influence of feedback control. 5. Verification of results through sample creation and evaluation of their quality. Textual Content Length: 60 - 80 pages.

Bibliography / sources:

- 1) I. Gibson, D. Rosen, B. Stucker, and M. Khorasani, Additive Manufacturing Technologies. Cham: Springer International Publishing, 2021. doi: 10.1007/978-3-030-56127-7.
- 2) T. DebRoy et al., "Additive manufacturing of metallic components – Process, structure and properties," Progress in Materials Science, vol. 92, pp. 112–224, Mar. 2018, doi: 10.1016/j.pmatsci.2017.10.001.

Name and workplace of master's thesis supervisor:

**Ing. Jan Brajer, Ph.D. Department of Production Machines and Equipment FME**

Name and workplace of second master's thesis supervisor or consultant:

**Ing. Martin Novák Department of Production Machines and Equipment FME**

Date of master's thesis assignment: **13.10.2023** Deadline for master's thesis submission: **02.01.2024**

Assignment valid until: **15.09.2024**

Ing. Jan Brajer, Ph.D.  
Supervisor's signature

doc. Ing. Petr Kolář, Ph.D.  
Head of department's signature

doc. Ing. Miroslav Španiel, CSc.  
Dean's signature

## III. Assignment receipt

The student acknowledges that the master's thesis is an individual work. The student must produce his thesis without the assistance of others, with the exception of provided consultations. Within the master's thesis, the author must state the names of consultants and include a list of references.

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Date of assignment receipt

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Student's signature