Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Hilfswissenschaftler – Teaching assistant (TA)
Laser in Manufacturing lecture 2024 (Prof. Bambach)

Motivation:
One of the research scopes of the Advanced Manufacturing laboratory (AMLZ) is lasers, and in particular their role and applications in manufacturing. It includes laser additive manufacturing, laser ablation, laser surface treatments and many more state-of-the art processes and technologies.

Both the industry and research around these topics require a highly qualified workforce, and this is why the AMLZ professorship will propose a new Masters lecture for the academic year 2024-25: “Lasers in Manufacturing”. The scope of this lecture includes the theory of lasers, hands-on knowledge of laser manufacturing processes already industrialized, and processes still under development. The overview of this ambitious lecture is given on Table 1.

Lecture chapter	Session	Title
Introduction and fundamentals	1	Introduction to lasers in manufacturing
	2	Fundamentals of laser processing
Continuous wave lasers in manufacturing	3	Laser as a heat source: heat treatment & welding
	4	Laser metal additive manufacturing
	5	Process monitoring & laser tool characterization
	6	Laser material separation (drilling, cutting)
Pulsed lasers in micro manufacturing	7	Introduction to pulsed lasers and their applications
	8	Fundamentals of laser micro machining
	9	Pulsed laser sources, beam guiding and optics
	10	Pulsed laser drilling and cutting
	11	Pulsed laser surface texturing
	12	Pulsed laser turning and milling
Summary	13	New developments, summary and exam preparation

Table 1 – Overview of the chapters included in the course (13x45min)

Tasks:
The role of the TA from January 2024 to July 2024 will be to support the creation of the course material (slides and exercises) in tight collaboration with the Laser Group of AMLZ:

- Get familiar with the course content based on material provided by the laser group.
- Create the slides with the content and templates provided, complete it with own suggestions.
- Suggest and/or create exercises corresponding with the lecture chapters.

From the start of the academic year 2024, the TA will also support the exercise sessions, gather feedback from the students and participate in the evolution of the lecture.

Requirements:

- Enthusiast student with a strong interest in advance manufacturing and willingness to teach
- Full proficiency in MS Power Point.
- Must have followed the course “Additive Manufacturing” or “Fertigungstechnik” from Prof. Bambach and/or Prof. Wegener.
- Excellent communication skills. Spoken and written English mandatory (course in English).

Work conditions: Remote and/or on-site, mandatory monthly progress meeting.
Min 5h/week, Max 15h/week (semester) or 41h/week (semester breaks), to the TA discretion.
Gross hourly wage CHF 30.70.

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