MICRO-520 **Laser microprocessing**

Iseli Elia

Cursus	Sem.	Type
Mechanical engineering	MA2, MA4	Opt.
Microengineering minor	E	Opt.
Microtechnics	MA2, MA4	Opt.
Photonics minor	E	Opt.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	Oral
Workload	60h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	

Summary

The physical principles of laser light materials interactions are introduced with a large number of industrial application examples. Materials processing lasers are developing further and further, the lecture presents the physical limitations of the processes.

Content

1. Basics of laser processing
Lasers for machining, Optics - beam steering systems, beam quality; Optical properties of materials, Heat equation,
Applications - and examples:
Laser induced chemical reactions at surfaces for marking applications,
laser bending,
hole drilling,
laser cutting,
laser induced ablation,
gnerative processes

Keywords

laser, efficiency, beam quality, spot size, laser pulse duration, heat equation, losses, machining, marking, bending, drilling, cutting, ablation, generative processing, selective laser sintering, selective laser melting

Learning Outcomes

By the end of the course, the student must be able to:

- Decide which laser to use for which task
- Interpret the result of a laser processed sample
- Optimize a virtual laser process

Expected student activities

participate actively in the lecture
carry out exercises

Assessment methods

Oral examination

Resources

Moodle Link

- https://go.epfl.ch/MICRO-520