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,
- generative 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