Zurich University of Applied Sciences

School of Engineering

t.AGO - Applied Optics

Person responsible for the course:	Ralf Markendorf, mklf
Responsible OU:	
ECTS:	4
Valid for:	2012/2013
Last saved:	18.03.2013 16:26

Expertise:

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Methodological skills:

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Social skills:

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Personal skills:

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Learning objectives:

Students learn and acquire the principles of geometrical and Gausssian beam optics, guided light waves, light switching and interaction of light and matter that are technological important in integrated optics, fiber optics, optical measurement engineering and sensor technology. They gather experience in evaluating optical parameters and their impact when implementing optical entities in the range of sensors, optical analytics and fibers.

Course content:

Wave optics: wave function, types of waves, Huygens-Fresnel's principle, simplest superpositions of waves, ARC, HR-Spiegel, wave properties of laser light
Geometrical optics: Optical images from lenses, lense equation, ABCD-matrices, technical components
Interference: two-wave interference, Michelson- and Mach-Zehnder-Interferometer, multiple-wave interference, Fabry-Perot-Interferometer, temporal coherence
Diffraction: diffraction at a single slit, circular aperture, diffraction grating, gratings in spectroscopy and holography, wave propagation in free space, far field, resolution of optical instruments
Laser: Quantum nature of light, spontaneous and stimulated emission, 4-level-laser
Optical wave guides, laser diodes: Principles of light guidance, mode equation, material-, wave guide- and modal dispersion, fiber-parameters, bandwidth-length-product, setup and characteristics of laser diodes
Laboratory in 3 areas:
a) Optical biosensors and measurement engineering
b) Properties of optical fibers, sources of coherent light, fiber sensors
c) Materials processing with lasers

Previous knowledge:

Physics and Mathematics teached during the first term

Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	8*3
Tutorial/Practicum	exercise couses: 8*1, lab: 6*4
Block instruction	

Assessment:

According to the table or as specified in writing by the lecture at the beginning of the semester!

description	type	form	scope	assessment	weighting
Performance records during school hours					
Semester end exam					

Language of instruction:

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Instruction material:

- Lecture notes - Collection of problems and solutions - laboratory documents

Additional literature:

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Comments:

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