

COSI « Industrial and Biomedical optics »

Course code: 3312061

Course level: Master

ECTS Credits: 4.00

Course instructor/s: Prof. Kai Peiponen (UEF)

Education period (Dates): 3rd semester **Language of instruction:** English

Expected prior-knowledge: Optics and photonics

Aim:

This course introduces some sensing solutions for industrial and biomedical optical inspection purposes. Interactive teaching methods during lectures and exercises are favored. Exercises include reading and discussion of original articles, patents, brochures, news etc. on the development of optical measurement techniques for industry and medicine.

Course outline

- Applied optical spectroscopy
- Machine vision systems
- Optical inspection of surface
- Laser Doppler velocimetry
- Fiber optic sensors
- Digital holography

Learning Outcomes:

- 1) Knowledge: Get a glue about past and current development of optical sensor solutions for industrial and hospital environments
- 2) Comprehension: You understand the requirements and critical matters demanded in practical metrology
- 3) Application: You get familiar with different sources that describe up-to-date sensor development and know how to apply both sources and sensors
- 4) Analysis: you can break something down;
- 5) Synthesis: You may put forward sensor developments by bringing fresh ideas

Assessment methods and tasks: Written exam (100%)

Assessment criterion:

Grading 1—5.

Literature and study materials:

- K.-E. Peiponen, Industrial and biomedical optics (course material 2014)
- K.-E. Peiponen, R. Myllylä, A. V. Priezhev, Optical Measurement Techniques Innovations for Industry and Life Sciences (Springer, Berlin, 2009)

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