Last update: 29-04-2014

32061 - OM - Optical Metrology

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering

Teaching unit: 731 - OO - Department of Optics and Optometry

Academic year: 2014

Degree: MASTER IN PHOTONICS (Syllabus 2009). (Teaching unit Optional)
DOCTORATE IN OPTICAL ENGINEERING (Syllabus 2007). (Teaching unit Optional)
DOCTORATE IN PHOTONICS (Syllabus 2007). (Teaching unit Optional)
ERASMUS MUNDUS MASTER IN PHOTONICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Teaching unit Optional)

ECTS credits: 5 Teaching languages: English

Teaching staff

Coordinator: SANTIAGO ROYO ROYO

Others: FERRAN LAGUARTA BERTRAN - FIDEL VEGA LERIN

Teaching methodology

Presencial Teaching + Activities

Learning objectives of the subject

Optical techniques offer a wide variety of solutions for the measurement of real-world problems. Non-contact in nature, a variety of measurement principles allows covering a broad range of measurement applications both in research and in industry. In this course, students will be provided with a practical and theoretical overview on the basics of optical metrology techniques. We will also review the different major families of techniques and applications which allow the measurement of different surface and material features. Finally students will be introduced to some relevant applications of optical metrology in the industrial and research fields.

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Content

-Basic concepts involved in optical surface metrology. Surface characterization: shape	Learning time: 30h Large group/Theory: 26h Medium group/Practical: 4h

-Overview of surface metrology techniques: contact, SPM and optical sensors

Degree competences to which the content contributes:

-Advanced Optical Imaging Theory

Degree competences to which the content contributes:

-Single point techniques: triangulation, dynamic focusing, confocal, chromatic

Degree competences to which the content contributes:

-Imaging techniques: fringe projection, deflectometry, confocal, interferometry (PSI,

Degree competences to which the content contributes:

-Characterization of stratified media: Confocal. Interferometry. Reflectometry.

Degree competences to which the content contributes:

-Optical metrology of laser-induced photonics structures: mode beam propagation

Degree competences to which the content contributes:

-Fluorescence techniques. High lateral resolution arrangements: 4 Pi, STED

Degree competences to which the content contributes:

-Applications of optical metrology techniques

Degree competences to which the content contributes:

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Qualification system

Students will be assigned a number of tasks related to the contents of the course and their interests along the semester. This task will represent 60% of the total course evaluation.
· A final examination at the end of the semester for a 40% of the final mark.
· Optionally, students may choose at the beginning of the semester to be evaluated for a 100% weight in the final exam, avoiding the task assignments.

Regulations for carrying out activities

The usual in University teaching

Bibliography

Basic:

Gasvik, K.J. Optical metrology. 3rd ed. Chichester: John Wiley & Sons, 2002. ISBN 9780470843000.

Malacara, D. (ed.). Optical shop testing. 3rd ed. New York: John Wiley & Sons, 2007. ISBN 9780471484042.

Cielo, P.G. Optical techniques for industrial inspection. Boston: Academic Press, 1988. ISBN 0121746550.

Rastogi, P.K. (ed.). Optical measurement techniques and applications. Boston: Artech House, 1997. ISBN 0890065160.

Complementary:

Gu, M. Advanced optical imaging theory. Berlin: Springer, 2000. ISBN 3540662626.

American Society of Mechanical Engineers. surface texture: surface roughness, waviness and lay. Standard B46.1-2002. New York, NY: ANSI/ASME Standard, 2003. ISBN 0791828018.