MASTER OF SCIENCE IN ENGINEERING

Zürcher Hochschule für Angewandte Wissenschaften
School of Engineering

Supplementary Course (EVA) at ZHAW School of Engineering

Title: Hands-on Experiences in Spectroscopy, Interferometry, and Light Emission
Short Code: rEVA_PhotLab

ECTS Credits	3
Profile	Photonics and Laser Engineering
Responsible Institute /Centre	Institute of Applied Mathematics and Physics (IAMP)
Responsible lecturer and contact informtion	Christoph Stamm (stac@zhaw.ch)
Type and duration of examinations	Oral presentation (25%), Work in the Lab (25%), Lab report (50%)
Start date and duration	Semester: Spring Details: Week 11: Coming together (virtual, 2 h) Week: 21: Oral presentation (half a day) Week: 23: Hands-On Experiments (2-3 days) Week: 27: Deadline for Final reports
Location	Winterthur
Course type	Block seminar • Contact hours: 18(hrs) • Guided self-study: 50 (hrs) • Independent self-study: 22 (hrs)
Language of instruction	English
Short description (max. 300 characters)	This course offered by ZHAW's optics laboratories provides hands-on experience in the areas spectroscopy, interferometry, and light emission. The hands-on laboratory experiences contributes to deepening the theoretical understanding of some fundamental topics of Photonics through application.
Contents and Learning Objectives	The course takes place in the optical research laboratories of ZHAW in Winterthur, where the mentioned techniques are continuously investigated and pushed further in cutting-edge research projects. Starting from the adjustment of a simple interferometer, interferometry is investigated in advanced settings, such as fiber optical rotational sensing, the characterization of a laser using a Fabry-Perot interferometer, and terahertz spectroscopy, including the generation and application of terahertz waves. The analysis of emitted light is the principle behind many sensors and is used in a huge number of applications in gas- and biosensing. Two examples analyzed in this course are thermography, which delivers specific information about the temperature and surfaces, and fluorescence spectroscopy, which allows gaining knowledge of the analyzed material or its environment. Another technology that is analyzed is quantum dots (QDs) placed in thin

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	optical films. QDs represent modern fluorescent dyes whose properties can be customised and are becoming increasingly important in the further development of displays and solar panels, for example. The hands-on laboratory experience will be complemented by data analysis techniques which will contribute to the theoretical understanding. The course includes student seminars on the theoretical aspects of topics related to the experimental activities. For these seminars, the theory will be analyzed in guided self-studying sessions followed by short oral presentations.			
Prerequisites	At least one semester of “Photonics” has to be completed.			
Literature	Course material will be distributed in digital copies to the students.			
Special requirements	Willing to perform experiments in the lab.			
Offer for profiles	Aviation (Avi)	☐	Business Engineering (BE)	☐
	Computer Science (CS)	☐	Data Science (DS)	☐
	Electrical Engineering (ElE)	☒	Energy & Environment (EnEn)	☐
	Mechanical Engineering (ME)	☐	Mechatronics & Automation (MA)	☐
	Medical Engineering (Med)	☒	Photonics and Laser Engineering (Pho)	☒
	Information and Cyber Security (ICS)	☐	Civil Engineering (CE)	☐