Laser Systems & Applications

MSc in Photonics

Master Europhotonics

Academic Year 2016-2017

UNIVERSITAT POLITÈCNICA DE CATALUNYA

UAB Universitat Autònoma de Barcelona

UNIVERSITAT DE BARCELONA

ICFO Institut de Ciències Fotòniques

Instructors

- Cristina Masoller (coordinator)

cristina.masoller@upc.edu

- Muriel Botey muriel.botey@upc.edu

Universitat Politecnica de Catalunya (UPC)

Meetings to clarify doubts, discuss grades or personal circumstances can be arranged via email.

BLOCK 2 (Campus Nord: UPC) 5/12/2016 to 12/02/2017

6 TEACHING WEEKS (5/12/2016 to 31/01/2017)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00					
11:00-12:00			SEMINARS AULA:A4204		
12:00 -13:00					
13:00-14:00					
14:00-15:00	VISUAL BIOPHOT & MULTISPECTRAL IMAGING (*) room	NONLINEAR OPTICS room	VISUAL BIOPHOT & MULTISPECTRAL IMAGING (*) room	NONLINEAR OPTICS room	INTEGRATED PHOTONICS room
15:00-16:00	ADV. QUANTUM OPTICS WITH APPLICATIONS(*) room		ADV. QUANTUM OPTICS WITH APPLICATIONS(*) room		
16:00-17:00	BUSINESS & PATENTS IN PHOTONICS (continue in BLOCK 3) room	LASER SYSTEMS & APPLICATIONS room	INT. PHOTONICS (*) Room	LASER SYSTEMS & APPLICATIONS room	BUSINESS & PATENTS IN PHOTONICS (continue in BLOCK 3) room
17:00-18:00			OPT. MICROMAN. WORKSHOP(*) AULA:526 UB-PHYSICS		
18:00-19:00	FIBERS & TELECOM room	IMAGE PROC. IN BIOPHOTHONICS room	FIBERS & (*) TELECOM room	IMAGE PROC. IN BIOPHOTHONICS room	
19:00-20:00			OPT. MICROMAN. WORKSHOP (*) AULA:526 UB-PHYSICS		

SCHEDULE

Semiconductor light sources

- 1 (13/12/2016) Introduction. LEDs and amplifiers.
- 2 (15/12/2016) Semiconductor lasers.
- 3 (20/12/2016) New materials and cavity designs.
- 4 (22/12/2016) Laser models.
- 5 (10/1/2017) Laser models.
- 6 (12/1/2017) Applications.

High power laser systems

- 7 (17/1/2017) Laser-based material processing.
- 8 (19/1/2017) Excimer and femtosecond lasers. Non-thermal ablation and micromachining.

Biomedical applications

- 9 (24/1/2017) Laser safety.
- 10 (26/1/2017) Biomedical lasers and applications.

Special sessions

- 11 (31/1/2017) Students' presentations.
- 2/2/2017: Students' presentations (16-17:00 hs) & exam (17:00-18 hs).
- 7/2/2016: (Activity week) Visit to company Monocrom (www.monocrom.com/).

- Your attendance in class is expected, particularly to the special sessions; however, you will not be penalized **for missing up to two regular classes**. If serious circumstances require you to miss more classes, you should provide the instructors with appropriate justification.

- During sessions 4 & 5 (Laser models) the students will use their **own computers** to do simulations using their preferred programming language. Graphics software (such as Matlab) will be required and should be installed in the computers.
- Transport will be provided for the visit to Monocrom, which will last about 3 hs.

EVALUATION

- Oral or written presentation (40%). The student will be able to chose the topic among a list of topics proposed by the instructors. Student collaboration is allowed and encouraged; however, the presentations will be evaluated individually.
- Exam (40%).
- Attending classes and homework (20%). Homework received up to 48 hours after deadline will be penalized by 30% and will not be accepted after that.

BIBLIOGRAPHY

- Fundamentals of Photonics, B. E.A. Saleh and M.C. Teich (Wiley, 2nd ed., 2007).
- Semiconductor Lasers: Stability, Instability and Chaos, J. Ohtsubo (Springer, 2006).
- Laser Processing of Materials, P. Schaaf ed. (Springer, 2010).
- Additional references will be indicated in each Module.