Laser Systems & Applications

MSc in Photonics

Master Europhotonics

Academic Year 2017-2018

UNIVERSITAT POLITÈCNICA DE CATALUNYA

UAB Universitat Autònoma de Barcelona

UNIVERSITAT DE BARCELONA

ICFO Institut de Ciències Fotòniques

Instructors

- Cristina Masoller (coordinator)

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Universitat Politecnica de Catalunya (UPC)

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

BLOCK 2 (Campus Nord: UPC)

6 TEACHING WEEKS (11/12/2017 to 4/02/2018)

Christmas holidays: *23/12/2017 - 7/01/2018*
Exams**:** *5 - 9/02/2018*

	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 (*) Room	NONLINEAR OPTICS Room	VISUAL BIOPHOT (*) Room	NONLINEAR OPTICS Room	INTEGRATED PHOTONICS Room
15:00-16:00	ADV. QUANTUM OPTICS WITH APPLICATIONS(*) Room		ADV. QUANTUM OPTICS WITH APPLICATIONS(*) Room		FROM TRAPPING TO COOLING...
16:00-17:00	BUSINESS & PATENTS IN PHOTONICS (continue in BLOCK 3) Room	LASER SYSTEMS & APPLICATIONS Room	OPT. MICROMAN. WORKSHOP AULA:526 UB-PHYSICS	LASER SYSTEMS & APPLICATIONS Room	BUSINESS & PATENTS IN PHOTONICS (continue in BLOCK 3) Room
17:00-18:00					
18:00-19:00	FIBERS & TELECOM Room	INTEGRATED PHOTONICS Room		FIBERS & TELECOM Room	
19:00-20:00		FROM TRAPPING TO COOLING...			

SCHEDULE

Semiconductor light sources

- 1 (12/12/2017) Introduction. Semiconductor materials.
- 2 (14/12/2017) LEDs and amplifiers.
- 3 (19/12/2017) Semiconductor lasers.
- 4 (21/12/2017) **NO CLASS**.

High power laser systems

- 5 (9/1/2017) Laser-based material processing.
- 6 (11/1/2017) Excimer and femtosecond lasers.
- 7 (16/1/2017) Applications

Laser models

- 8 (18/1/2017) Laser turn on and modulation response.
- 9 (23/1/2017) Injection locking, external-cavity lasers.
- 10 (25/1/2018) Simulations

Biomedical applications

- 11 (30/1/2018) Biomedical lasers and applications.

Special sessions

- 10 (25/1/2018) Simulations
- 12 (1/2/2018) Students' presentations.
- 12/2/2017: Students' presentations (14-15 hs) & exam (15-16 hs).
- **13/2/2017 (11 hs): Visit to Monocrom (www.monocrom.com)**

During Session 10 (25/1/2018: Simulations) the students will use their **own computers** to perform simulations of laser models using their preferred programming language. Graphics software (such as Matlab) will be required and should be installed in the computers. At the next class the students should present a report (in a **single pdf file**) that includes an annex with the programs.

- Your attendance to class is expected, particularly to these 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.

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**. **The grade will also take into account the type of presentation (oral/written).**
- 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).
- *Photonic devices*, J. M. Liu (Cambridge 2009)
- *Semiconductor Lasers*, J. Ohtsubo (Springer, 3er ed. 2013)