



## Course guides

# 320031 - FOAE - Photonics. Optics Applied to Engineering

Last modified: 29/05/2020

**Unit in charge:** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
**Teaching unit:** 748 - FIS - Department of Physics.

**Degree:** BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).  
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).

**Academic year:** 2020    **ECTS Credits:** 6.0    **Languages:** English

## LECTURER

**Coordinating lecturer:** Ramon Herrero

**Others:** Josep Trull, Ramon Herrero, Juanjo Fernandez, Carme Hervada, Jordi Sellarès, Maria Carme Torrent

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

### Transversal:

1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
3. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
4. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
5. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

## TEACHING METHODOLOGY

## LEARNING OBJECTIVES OF THE SUBJECT

## STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	30,0	20.00
Hours medium group	15,0	10.00



Type	Hours	Percentage
Hours small group	15,0	10.00

**Total learning time:** 150 h

## CONTENTS

### (ENG) Título contenido 1: Naturaleza y propagación de la luz

**Full-or-part-time:** 14h

Theory classes: 4h

Practical classes: 2h

Self study : 8h

### (ENG) Título contenido 2: Óptica geométrica e instrumentos ópticos

**Full-or-part-time:** 14h

Theory classes: 4h

Practical classes: 2h

Self study : 8h

### (ENG) Título contenido 3: Interferencias

**Full-or-part-time:** 13h 30m

Theory classes: 4h

Practical classes: 1h 30m

Self study : 8h

### (ENG) Título contenido 4: Difracción

**Full-or-part-time:** 12h 30m

Theory classes: 3h

Practical classes: 1h 30m

Self study : 8h

### (ENG) Título contenido 5: Polarizadores i medios anisótropos

**Full-or-part-time:** 13h

Theory classes: 3h

Practical classes: 2h

Self study : 8h

### (ENG) Título contenido 6: Fuente convencionales de luz

**Full-or-part-time:** 5h 30m

Theory classes: 1h

Practical classes: 0h 30m

Self study : 4h



**(ENG) Título contenido 7: Láser**

**Full-or-part-time:** 13h 30m

Theory classes: 4h

Practical classes: 1h 30m

Self study : 8h

**(ENG) Título contenido 8: Tecnología láser**

**Full-or-part-time:** 9h

Theory classes: 2h

Practical classes: 1h

Self study : 6h

**(ENG) Título contenido 9: Fotodetectores**

**Full-or-part-time:** 3h 30m

Theory classes: 1h

Practical classes: 0h 30m

Self study : 2h

**(ENG) Título contenido 10: Radiometría, fotometría y colorimetría**

**Full-or-part-time:** 3h 30m

Theory classes: 1h

Practical classes: 0h 30m

Self study : 2h

**(ENG) Título contenido 11: Optoelectrónica y fibras ópticas**

**Full-or-part-time:** 11h

Theory classes: 3h

Practical classes: 2h

Self study : 6h

## ACTIVITIES

**(ENG) ACTIVIDAD 1: LABORATORIO**

**Full-or-part-time:** 15h

Laboratory classes: 15h

**(ENG) ACTIVIDAD 2: TRABAJO DE PROFUNDIZACIÓN**

**Full-or-part-time:** 16h

Self study: 16h



### (ENG) ACTIVIDAD 3: PRUEBA PARCIAL

**Full-or-part-time:** 3h

Theory classes: 3h

### (ENG) ACTIVIDAD 4: EXAMEN FINAL

**Full-or-part-time:** 3h

Theory classes: 3h

## GRADING SYSTEM

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## BIBLIOGRAPHY

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### Basic:

- Smith, F.G.; King, T.A. Optics and photonics: an introduction. Chichester: John Wiley & Sons, 2000. ISBN 0471489255.
- Saleh, B.E.A.; Teich, M.C. Fundamentals of photonics. New York: Wiley-Interscience, 1991. ISBN 0471839655.
- Hecht, Eugene. Óptica. 3ª ed. Madrid: Addison-Wesley Iberoamericana, cop. 2000. ISBN 9788478290253.
- Pedrotti, F.L.; Pedrotti, L.S. Introduction to optics. 2nd ed. New Jersey: Prentice-Hall, 1993. ISBN 0135015456.

### Complementary:

- Smith, Warren J. Modern optical engineering: the design of optical systems. 3rd ed. New York: McGraw-Hill, 2000. ISBN 0071363602.
- Lizuka, Keigo. Engineering optics. 3rd ed. New York: Springer, 2008. ISBN 9780387757230.
- Bachs, L.; Cuesta, J.; Nogués, C. Aplicaciones industriales del láser. Barcelona: Marcombo, 1988. ISBN 842670719X.
- Uiga, Endel. Optoelectronics. Englewood Cliffs: Prentice Hall, 1995. ISBN 0024221708.
- Dereniak, E.L.; Crowe, D.G. Optical radiation detectors. New York: Wiley, 1984. ISBN 0471897973.
- Pinson, L.J. Electro-optics. New York: Wiley, 1985. ISBN 0471881422.
- Judd, D.B.; Wyszecki, G. Color in business, science and industry. 3rd ed. New York: John Wiley & Sons, 1975. ISBN 0471452122.