

320031 - FOAE - Photonics. Optics Applied to Engineering

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	748 - FIS - Department of Physics
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits:	6
Teaching languages:	English

Teaching staff

Coordinator:	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.

Learning objectives of the subject

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Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	15h	10.00%
	Hours small group:	15h	10.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

(ENG) Título contenido 1: Naturaleza y propagación de la luz	Learning time: 14h Theory classes: 4h Practical classes: 2h Self study : 8h
(ENG) Título contenido 2: Óptica geométrica e instrumentos ópticos	Learning time: 14h Theory classes: 4h Practical classes: 2h Self study : 8h
(ENG) Título contenido 3: Interferencias	Learning time: 13h 30m Theory classes: 4h Practical classes: 1h 30m Self study : 8h
(ENG) Título contenido 4: Difracción	Learning time: 12h 30m Theory classes: 3h Practical classes: 1h 30m Self study : 8h
(ENG) Título contenido 5: Polarizadores i medios anisótropos	Learning time: 13h Theory classes: 3h Practical classes: 2h Self study : 8h
(ENG) Título contenido 6: Fuente convencionales de luz	Learning time: 5h 30m Theory classes: 1h Practical classes: 0h 30m Self study : 4h

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(ENG) Título contenido 7: Láser	Learning time: 13h 30m Theory classes: 4h Practical classes: 1h 30m Self study : 8h
(ENG) Título contenido 8: Tecnología láser	Learning time: 9h Theory classes: 2h Practical classes: 1h Self study : 6h
(ENG) Título contenido 9: Fotodetectores	Learning time: 3h 30m Theory classes: 1h Practical classes: 0h 30m Self study : 2h
(ENG) Título contenido 10: Radiometría, fotometría y colorimetría	Learning time: 3h 30m Theory classes: 1h Practical classes: 0h 30m Self study : 2h
(ENG) Título contenido 11: Optoelectrónica y fibras ópticas	Learning time: 11h Theory classes: 3h Practical classes: 2h Self study : 6h

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Planning of activities

(ENG) ACTIVIDAD 1: LABORATORIO	Hours: 15h Laboratory classes: 15h
(ENG) ACTIVIDAD 2: TRABAJO DE PROFUNDIZACIÓN	Hours: 16h Self study: 16h
(ENG) ACTIVIDAD 3: PRUEBA PARCIAL	Hours: 3h Theory classes: 3h
(ENG) ACTIVIDAD 4: EXAMEN FINAL	Hours: 3h Theory classes: 3h

Bibliography

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.