

Subject	OPTICAL ENGINEERING
Credits	3 ECTS (3T)
Character	Elective
Semester	1st
Language	English

Competences

CG3 - Creativity: To conceive, develop and validate new systems that can increase the quality of life of people; to carry out, in academic and professional contexts, innovations or technological advances that can advance the state of the art.

CG5 – Information management: to search for and manage appropriate bibliographic resources efficiently, to learn to continue studies in a largely autonomous way as a basis for future research and innovation activity

CG7 - Work in international contexts: To carry out a substantial research process with academic seriousness and integrity, integrated in an R+D+i group with international projection

CG8 - Apply methodologies, procedures, tools and state-of-the-art standards for the creation of new technological components; build new hypotheses and models, evaluate them and apply them to problem solving

CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context

CB7 - Students should be able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

CB8 - Students are able to integrate knowledge and face the complexity of making judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities related to the application of their knowledge and judgments.

CB9 - Students should be able to communicate their conclusions and the ultimate knowledge and rationale behind them to specialized and non-specialized audiences in a clear and unambiguous manner

CB10 - That students possess the learning skills that will enable them to continue studying in a manner that will be largely self-directed or autonomous.

CT3 - Use of the English language: understand the contents of lectures, conferences and seminars in English; write reports and scientific-technical articles in English using computer tools; make public presentations in English of research work, results and conclusions, for example, in the subjects of the Master or in congresses of a mostly international nature or in stays in foreign centers, all with the help of audiovisual computer media

CE6 - Apply design methodologies and implementation of automatic learning and classification techniques for intelligent knowledge management.

CE8 - Design and build a functional prototype of a photovoltaic system going through all the phases of the process within a teamwork scheme

CE9 - Apply the services and tools available in the market to the design of photovoltaic systems.

Outcomes

RA05 - Relate basic principles to practical aspects.

RA40 - Know the theory and applications of optics to photovoltaic solar cells.

RA41 - Know the fundamentals of photovoltaic concentration.

RA42 - To understand the factors that influence the application of optics to photovoltaic solar cells.

RA45 - To enable the student to make presentations in public.

RA47 - To learn to argue convincingly

Description and syllabus

The fundamentals of optics and its application in the photovoltaic field are shown. In particular, the subject of concentration and its relationship with angular acceptance is discussed and how both variables affect the cost of the concentration system. The student is also introduced to the engineering of optical devices, other applications similar to photovoltaic concentration such as those related to the use of LEDs or wireless optical communications. The course covers the theoretical foundations and methods of design and analysis up to the techniques of fabrication and characterization in optical engineering.

Schematically, the syllabus includes:

1. Engineering optics
2. Geometrical optics
3. Radiometry and photometry
4. Characterization of optical materials
5. Software tools
6. Photovoltaic concentration
7. Acceptance angle of a photovoltaic system
8. Solid state lighting