



Course guide

230361 - SCD - Solar Cells for Dummies

Last modified: 24/05/2024

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2022). (Optional subject).

Academic year: 2024 **ECTS Credits:** 2.5 **Languages:** English

LECTURER

Coordinating lecturer: JOAQUIN PUIGDOLLERS GONZALEZ

Others: Segon quadrimestre:
JOAQUIN PUIGDOLLERS GONZALEZ - 30

PRIOR SKILLS

The requirements to take this seminar are a science-based degree (engineering, physics, chemistry, biology)

REQUIREMENTS

See previous paragraph

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CEE12. Ability to use semiconductor devices taking into account their physical characteristics and limitations.

CEE24. Ability to identify and evaluate innovative ideas and products in the area of electronic technology.

Transversal:

CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

The teaching methodology is based on master classes with continuous interaction with the student. Apart from the lectures provided by the teacher, students will be provided with scientific articles that will be discussed in class.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student will understand the principles of operation of any kind of solar cell. independently of the compounds they are based on.

Solar cells based on emergent semiconductors will be described with more detail.



STUDY LOAD

Type	Hours	Percentage
Self study	42,5	68.00
Hours large group	20,0	32.00

Total learning time: 62.5 h

CONTENTS

The use of selective contacts in solar cells

Description:

- 1: Why electrons flow. Electrochemical potentials.
- 2: Solar cell: absorber + selective contacts
- 3: Equation of a solar cell
- 4: Manufacturing technology. Includes a visit to the Sala Blanca facilities (Campus Nord and Campus Besos)

Specific objectives:

To introduce students to the technology of photovoltaic devices. Understand the principles of operation of solar cells.

Full-or-part-time: 20h 30m

Laboratory classes: 3h 30m

Guided activities: 6h

Self study : 11h

GRADING SYSTEM

Assessment will be based on the submission of an abstract of a recently published research paper which will be provided to students. Students must discuss the research work and carry out a critical review based on the knowledge provided in class.

BIBLIOGRAPHY

Basic:

- Nelson, J. The Physics of solar cells. Imperial College Press, 2003. ISBN 1860943497.
- Wurfel, P.; Wurfel. U. Physics of solar cells : from basic principles to advanced concepts [on line]. 3rd ed. Weinheim: Wiley-VCH, 2016 [Consultation: 02/04/2020]. Available on: <https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=4557230>. ISBN 9783527413096.

RESOURCES

Other resources:

<https://www.youtube.com/watch?v=NkSWeP81Lq8> /><https://www.pveducation.org/> /> Misconceptions and Misnomers in Solar Cells, Andres Cuevas; Di Yan DOI: 10.1109/JPHOTOV.2013.2238289