Summer Study Abroad Course on Electrical Engineering:

"POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS AND ELECTRICAL VEHICLES"

by prof. Angel Cid

This three weeks program will offer the students training in Power electronics for renewable energy systems and electrical vehicles, as well as different field and cultural visits.

The aim of this course is to introduce the students to the main electric architectures and energy processing functions that are inherently necessary in the field of Renewable Energy Systems (RES) and Electric Vehicles (EV).

The course is organized in lecture sessions and laboratory assignments for three weeks in order to provide the students an applied vision of these challenging fields. The students will design and simulate using PSIM software two examples of application: a solar battery charger and the electric power management of an EV.

CONTENT:

Lecture Contents (50 % of the course):

- Theme 1: Introduction, state-of-the-art and socioeconomic impact of RES and EVs technologies.
- Theme 2: Introduction to basic power electronics topologies.
- Theme 3: Electrical Architectures in Renewable Energy Systems.
- Theme 4: Maximization of the energy production in Photovoltaic Systems: Maximum Power Point Tracking (MPPT)
- Theme 5: Electric Power Distribution Architectures in EVs.
- Theme 6: Power Electronics converters in EVs: battery chargers, powertrain, …
- Theme 7: Energy storage systems for RES and EVs.

Laboratory (50 % of the course):

#1: Simulation and design of a solar battery charger for stand-alone PV applications

#2: Simulation and design of the electric power management of an EV