The Technical University of Madrid's

Master of Science in Photovoltaic Solar Energy

Welcome!

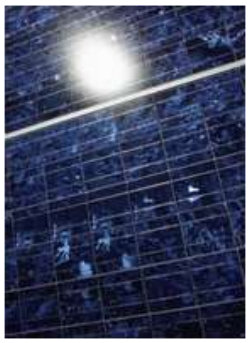
Thank you for your interest in our Master of Science on Photovoltaic Solar Energy. This program is offered by the Solar Energy Institute of the Technical University of Madrid (Universidad Politécnica de Madrid) one of the oldest institutions in the world dedicated to research and academic training on Photovoltaic Solar Energy. Our program has been carefully designed to meet the intense demand for highly qualified professionals in the area of photovoltaic engineering. We are convinced that Photovoltaic Solar Energy will be a corner stone in the energetic revolution to take place in the 21st century and we have designed this Master to train the experts and leaders that will turn this revolution into a reality. We are pleased to invite you to join our Master and become an agent for change in the world of renewable energies.

Why should I study a Master on Photovoltaic Solar Energy?

Photovoltaic solar energy is already an economically competitive, viable and ubiquitous option for mass production of clean electricity. It will be an important vector for the development of the electricity systems in many countries. Qualified professionals will be demanded for project management and engineering, infrastructure planning, PV manufacturing, research, consulting and academic and professional training.

Your host institution: the Solar Energy Institute of the Technical University of Madrid

The Solar Energy Institute of the Technical University of Madrid (Instituto de Energía Solar de la Universidad Politécnica de Madrid or IES-UPM for short), founded in 1979, is the oldest active institution in PV research in the World. More than 70 people from different countries work in virtually all facets of Photovoltaics, from basic science to project development, from materials science to electrical engineering. The Master's professors have led key initiatives for the advancement of Photovoltaics, held PV efficiency records, led flagship research projects and produced top-referred publications. Their educational activities include over one hundred Doctoral Thesis and pioneering teaching of Photovoltaics for undergraduate and graduate students.



Who are we looking for?

The Master is aimed at highly motivated science students and engineers interested in PV technology and with an environmental and sustainable development concern. A good science and technology backgrounds are needed in this fast-moving, cross-disciplinary, international field. To be admitted in the program the candidate must have basic knowledge on physics and electronics. Applicable academic degrees include physics, chemistry, materials science, electrical/electronic engineering, mechanical engineering, telecommunication engineering, industrial engineering, etc. If your degree is not in this list, contact us to check your eligibility. In addition, proficiency in English is a must since our Master is a bilingual program where the languages of instruction for the courses are both English and Spanish. Thereby, you must demonstrate an adequate level of English proficiency and basic knowledge of Spanish (or commitment to get it) prior to admission to the Master.

The IES-UPM learning experience

At IES-UPM we are convinced that real engineers, experts and leaders in any technology are forged in the real world. So our Master is a hands-on experience from start to end. In this respect, all photovoltaic infrastructures at IES-UPM are available and used to provide a comprehensive learning experience for students enrolled in the Master. During the Master you will produce solar cells using our solar cell manufacturing line; you will measure them using solar simulators in the solar cell characterization lab; you will characterize solar modules in our photovoltaic module testing station; you will rate the performance of real photovoltaic power plants connected to the grid; you will design, simulate and implement real PV installations, and you will use PV solar home systems to test smart grid strategies, among others … In summary, every single week during the master you will be engaged in practical labs to get a real grasp of some aspect of the technology. In addition to this approach, we also take full advantage of modern teaching tools and resources and do use *b-learning* (through a dedicated electronic learning platform based on MOODLE), video conferences, on-line seminars, to supplement classroom lectures and laboratory courses.

The syllabus

The Master of Science on Photovoltaic Solar Energy is a one-year program divided into two semesters, from September to July. To complete the master 60 ECTS credits have to be passed with the following structure: 21 ECTS of compulsory subjects, 24 credits of electives and 15 credits of a Master's Thesis. This effort is equivalent to 1500–1800 hours of study.





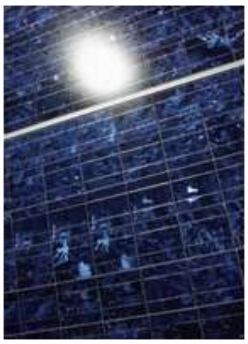


FIRST SEMESTER	
Compulsory subjects	ECTS
Fundamentals of solar cells	4
Energy and society	5
Solar cell characterization laboratory	4
Photovoltaic systems engineering	4
Electives	
Solar cell technology laboratory	5
Physics of photovoltaic materials	4
Optical engineering	4
Electrical engineering of photovoltaic systems	4
Energy today (Seminar)	4
SECOND SEMESTER	
Compulsory subjects	ECTS
PV modules and systems laboratory	4
Final Master Thesis	**15**
Electives	
Third generation solar cells	3
Computational laboratory of photovoltaic materials	4
Solar cells and PV systems simulation laboratory	4
Building integration of solar energy	4
Concentrator PV laboratory	4
Grid connected PV systems	4
PV market, finance and management (seminar)	4
Laboratory of electrical engineering for Photovoltaics	4

Admission, enrollment and cost

Step 1: Pre-registration

Your admission to the Master of Science in Photovoltaic Solar Energy depends on your prior education. So the first step is to complete a pre-registration process in which you provide some documentation about your academic background. To be admitted to the Master studies, applicants should hold a degree equivalent to 240 ECTS credits. The pre-registration process is done via the HELIOS web platform and there you have to provide your personal data and upload some documentation (application form, motivation letter, scan of your passport, CV in English, diplomas and degrees, transcript of courses with grades, ...). Detailed instructions on what documentation is needed depending of your country of origin is available at the HELIOS web.



The pre-registration period for the 2019-2020 academic year is **from February to the beginning of July 2019**

Step 2: Admission

The admission committee will process your application and will decide about your admission. In case admitted, you will be notified via email with additional instructions about how to proceed with your enrollment.

Once you have been admitted it is time to start arranging your student Visa (in case needed). Please, check with the Spanish consulate in your country what documentation is needed in your case. Be aware that the processing of a student visa may take several weeks or even months so don't procrastinate!

Step 3: Enrollment

Once admitted, the process of enrollment essentially consists in selecting the courses you will take the first semester and paying for the corresponding tuition fees. This can only be done at designated periods that the University establishes. For academic year 2019-2020, the enrollment periods are as follows:

- Period 1: July to September 2019 (specific dates tba)
- Period 2: February 2020 (specific dates tba)

To process your student visa (if needed) you will need a payment certificate. Therefore, for students needing a visa only the window in July is of practical relevance since the processing of the visa will take several weeks and thus registration in September is not an option as the course starts in late Sept.

Costs

The Master of Science on Photovoltaic Solar Energy is a postgraduate course promoted by a Spanish Public University (the Technical University of Madrid) and thus is subject to official fees set by the Autonomous Government of the region of Madrid. **The fees for course 2019-2020 have not been set yet and will be presumably published in August 2019.**

Just for reference, the fees for course 2018-2019 were around 45€ per ECTS for students coming from EU member states and 72€ per ECTS for students coming from non-EU countries. No additional admission or administration fees are needed. Therefore, total tuition fees for the Master were around 2700 € for EU students and 4320 € for non-EU students.

Send us an email for more information to **mariahelena.gomez@upm.es**