

Fco. J. Gimeno Sales

Salvador Orts Grau

Salvador Seguí Chilet

ON-LINE COURSE "INTRODUCTION TO PHOTOVOLTAIC POWER SYSTEMS". STUDENT GUIDE.

DEPARTMENT OF ELECTRONIC ENGINEERING

LIFELONG LEARNING CENTER

UNIVERSIDAD POLITÈCNICA DE VALÈNCIA



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA





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STUDENT GUIDE: "INTRODUCTION TO PHOTOVOLTAIC POWER SYSTEMS" (ONLINE COURSE)

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Introduction of the course

The on-line course "Introduction to Photovoltaic Power Systems" offered by the Polytechnic University of Valencia (official name: "Universitat Politècnica de València") has been configured as a technical introduction to this modern form of **distributed generation** where photovoltaic modules convert the solar radiation striking on its surface, into electricity.

In this **Student guide**, which we recommend you read, you will find the information needed to follow satisfactorily the training program that we have developed. You can contact the directors of this course in **Photovoltaic Power Systems** and leave any comments regarding the contents of this guide (use "Messages" or the "Forum" menu in PoliformaT or send an e-mail to ssegui@eln.upv.es if the web site is not available).

The course keeps been updated as this new technology progresses, which includes technical information about the latest products and developments in the sector. Also we are incorporating new online training methodologies that further increase the benefit of the training. Any suggestions or comments in this regard will be highly appreciated by the course directors and we apologize in advance if at any moment some of the tools do not work as expected.

We have developed this course based on the experience acquired in face-to-face courses since 2000 and online courses since 2010. In 2010 we developed our first face-to-face course given in English to ERASMUS students that were in the Polytechnic University of Valencia. Remember that our objective with this course is to transmit you our knowledge in this field. We also apologize in advance for any spelling or grammatical mistakes that may be present throughout the course.

Structure

The online course "Introduction to Photovoltaic Power Systems" is organized into three modules with a total duration of 6 ECTS (equivalent to a course of 60 classroom hours and 90 hours of personal work of the student). The course reviews the core fundamentals to understand photovoltaic energy and be able to carry out the design and maintenance of these energy generating installations. The course has a practical approach to the application and includes the latest advances in **photovoltaic technology** available on the market today. The described contents are reinforced with **examples and practical exercises** that allow you to apply the theoretical concepts developed in the different units.

Objective

The main objective of the online course "Introduction to Photovoltaic Power Systems" is to introduce the student to the applications of photovoltaic systems in the generation of electrical



energy for isolated applications (**off-grid photovoltaic systems**) or connected to the electrical power network (**grid connected photovoltaic systems**).

Photovoltaic energy is one of the **renewable energies** that has experienced a fast rise in recent years and that has provided one of the most employment opportunities: groups of R&D, engineering companies, electricity installers, technicians, maintenance, etc. The **photovoltaic generation** is becoming a fundamental part of the **energy mix** in which the sustainable energy society will be based on. It makes it necessary to have good quality training that meets the demand in this new professional activity. The possibilities of combining this technology with other renewable resources (hydro, wind, etc.) will allow the rural electrification of many areas of emerging countries, promoting rural development, increasing the quality of life in these areas and the settlement of the population.

Teaching Staff

The teaching staff responsible for the organization of the online course "Introduction to Photovoltaic Power Systems" belongs to the Department of Electronic Engineering, in the Polytechnic University of Valencia. They develop their research activities at the Institute of Molecular Recognition and Technological Development. The course also counts with the participation of specialists from photovoltaic companies that have collaborated in webinars and in the recording of audiovisual material, providing information and technical presentations of products.

Motivation

This course is offered with open enrolment all year round, trying to adapt to the personal calendar of each student who takes the course. This is why each student progresses through the course at their own pace. Try to be constant in your studies and to learn with the training material that we have created based on our teaching experience.

Since each student has their own start date and progresses at their own pace, in this course we will not send you emails or messages telling you:

- That you have to complete the study of a certain unit next week.
- That you have to submit an assignment by a certain date.
- That an exam is due on a certain day and you only have 30 minutes to complete it.

The only limitation you should consider is that you have 6 months from the date of enrolment to complete your studies. Once this time has expired, access to the teaching platform will be interrupted. If you do not manage to finish your studies within 6 months, you will be able to enrol again by paying €100. With the second enrolment you will have 3 months of access to the training material.



It is the responsibility of the student to maintain at a good level the motivation that motivated him/her to register for the course. In this respect it may be useful to remember the following quote from Alfred Hitchcock: "When an actor comes to me and wants to discuss his character, I say, 'It's in the script. ' If he says, 'But what's my motivation? ' I say, 'Your salary. '"

Please make good use of the 6 months you have to complete the course and be motivated by not having to pay for a second enrolment.

Access to the online training platform: PoliformaT

The teaching material used in the online course "Introduction to Photovoltaic Power Systems" will be available to the students in the online training platform of the Polytechnic University of Valencia, called **PoliformaT**. The **access to PoliformaT** is in https://www.upv.es/pls/soalu/sic_poliformat.login?P_CUA=sakai selecting the menu "Usuario CFP" from the list of options:

Identificación

Seleccione la forma de acceso

Accesos

Como Profesor o Personal UPV

Como Alumno UPV

Usuario CFP

Como EXTUPV (Externos)

Acceso Usuario PoliformaT

Write your **user name (Usuario)** and your **personal password (Clave)** and press the "Entrar" bottom.

Inicio de sesión con usuario y clave del CFP

Usuario: Clave:

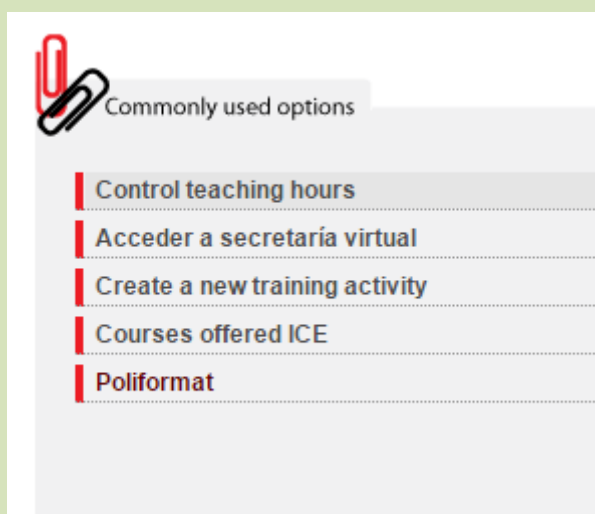
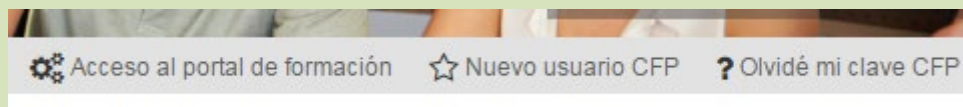
Entrar

? [Olvidé mi clave](#)



Your user name and personal password are provided during the registration process in the Centro de Formación Permanente (CFP or Lifelong Learning Center) of the Polytechnic University of Valencia.

If you select “Acceso al portal de formación” in www.cfp.upv.es, you will arrive to the main page of the CFP, where an access to PoliformaT appears at the end of the page.



If you cannot remember your password, go to <https://www.cfp.upv.es/formacion-permanente/registro/recordarclaveMail.jsp?idioma=en&> and fill in your email and you will receive an e-mail about how to set your password:

Fill in your email and you will receive an e-mail about how to set your password.

E-mail address:

After registration in the PoliformaT has been validated, the student will have access to a Web page where there are different menus available: Resources, Messages, Lessons, etc. The upper part shows the active courses/subjects for each student. In **Mi PoliformaT** site, in “**Preferencias**” tool, you can modify the language (“**Idioma**” menu) used in PoliformaT (Remember to click on “**Actualizar Preferencias**” to save the changes”).



During the course the student will have access to a site titled **PV_Intro_**** (where ** will correspond to the year of the current edition).

Due to synchronization task between the host computers of the UPV, PoliformaT is not working from 4:00 to 5:00 (Spain time zone).

You have **6 months** from the registration date **to complete the studies**. After this time has passed, the access to the teaching platform will be interrupted. Students who have not been able to conclude studies within 6 months can register again in the course with a reduced fee of 100 euros, which are due to administrative expenses. The student will then have 3 months to complete the studies.

Training material

The contents taught in the online course "Introduction to Photovoltaic Power Systems" are structured in three large blocks, each of them worth 2 ECTS credits:

- Module 1: introduction to Photovoltaic Systems (2 ECTS).
- Module 2: Grid-connected Photovoltaic Systems (2 ECTS).
- Module 3: Off-Grid Photovoltaic Systems (2 ECTS).

Each of the modules will be shown in PoliformaT in **LESSONS** as a section that will be **activated as the student passes the previous required parts**. Access to the training material is progressive as the different sections are completed.



In My PoliformaT - Preferences, you can modify the number of sites you see on the PoliformaT home screen. You can also find the sites you are active on by looking at the "Sites" tab (top right corner of the screen).

In My PoliformaT - Preferences you can change the email address associated with your PoliformaT user, where internal emails and announcements are sent. Use an email address that you check frequently to keep up to date with any announcements we make.

Once the student has completed the three modules that make up the course, they will have access to the course material until a request is made by the course director to the Lifelong Learning Centre of the UPV to issue the course certificate. **The dates of issue of the certificates** are detailed in the welcome page of the course (in **PV_Intro_****).

The modules are structured in different chapters or units, which are accessed via the '**Resources**' and '**Lessons**' menus in PoliformaT. The different units include solved examples and references to technical appendices that allow the student to get closer to the existing photovoltaic market.



Due to the nature of online training; the students can work at their own pace and schedule. It is estimated that each of the modules can be completed in 4-5 weeks (three months to carry out the entire course of 6 ECTS). To help studying the training material the student can carry out self-assessed exams available in LESSONS. These self-assessed exams will help revise the main contents developed and solve practical problems related to the contents described in the videos and slides of the course. More information about the exams is included in the section titled "Evaluation and certification of studies".

Self-assessed exam configuration:

- There is no due date or time limit for this assessment.



- You can submit this assessment an unlimited number of times. Answers from previous attempts will not be available within the assessment during subsequent attempts. Your highest score will be recorded.
- The highest score is recorded and sent to Gradebook.
- The complete Assessment is displayed on one Web page, with Feedback on submission

The "**Resources**" menu gives access to the documents that make up the course "Introduction to Photovoltaic Power Systems". We have used file names that identify the corresponding unit as well as the topic developed. The student can **access and download** the following **documents**:

- PDF files where the **contents of the chapters** are developed.
- Excel files with proposed and solved problems.
- PDF files with the slides **used in the audiovisual presentations** (teleconference sessions, polimedia videos, etc.) and which can be viewed in the "Lessons" menu (you can watch the videos in PoliformaT as many times as necessary but their download is not permitted).
- **Complementary files** which provide technical information of products, application notes, technical reports, and other materials related to training. There are about 700 MB of information that must **be considered additional information to expand the contents** according to the area of interest of each student. Their **reading is not mandatory**, but some of them will be used in the examples and exercises proposed.



Title	Access	Created By	Modified	Size
PV_M1_Comp Resources	Actions			
PV_INFO_extra	Actions Entire site	Salvador Segui Chilet	Feb 13, 2014 1:17 pm	5 items
PV_M1_Comp_en	Actions Entire site	Salvador Segui Chilet	Feb 13, 2014 1:14 pm	10 items
PV_M1_Comp_videos	Actions Entire site	Salvador Segui Chilet	Mar 3, 2014 4:51 pm	0 items

PoliformaT "Resources" menu screen

To **download the course documents** located in the "Resources" menu you can use the option "**Generate zip**". By clicking on this menu you'll access an application that generates a zip file with all the folders and files existing in "PoliformaT/Resources" and which you can download in a local directory of your personal computer.

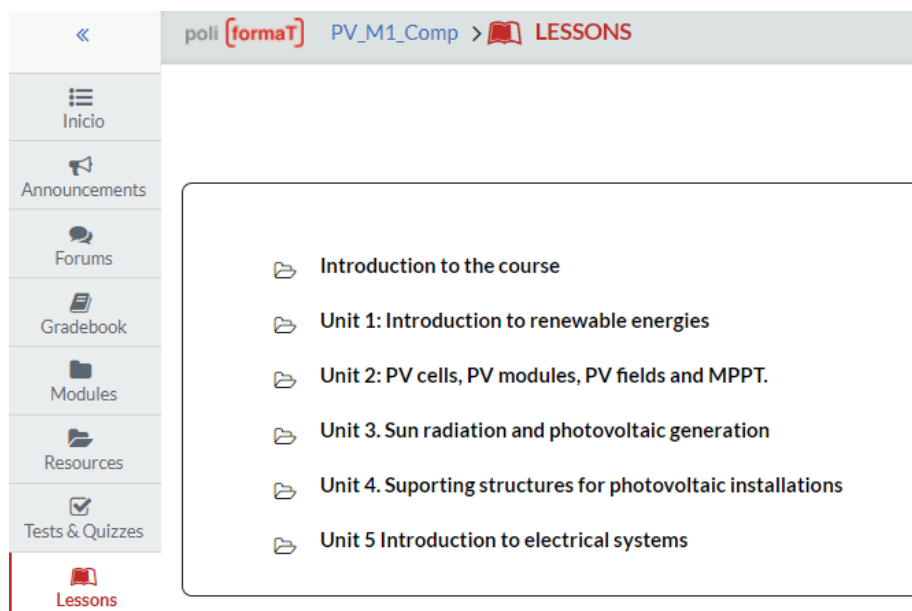
In the documentation provided in the course you will find documents that may seem old (because of the date) but are not technologically obsolete.

It is true that photovoltaic technology has grown and expanded in recent years but the strongest technological development occurred before 2010 and what is true is that the efficiency of electronic converters is continuously improving, the power and efficiency of photovoltaic modules is increasing, there are more powerful inverters, etc.

As technological development advances in some areas, we incorporate it into the course, such as the case of lithium batteries, which we incorporated into the notes in 2018, as well as examples of grid connections using these batteries in self-consumption systems.

I can assure you that the information is still valid, although it may seem old. The important part of the course is the handling of the information and the processes of design and selection of the components, which will allow you to continue applying the concepts to new products appearing on the market.

The "**Lessons**" menu includes audiovisual material that covers all the content of the units that make up this online course "Introduction to Photovoltaic Power Systems". The audiovisual material for this online course has been developed in the studios of the Polytechnic University of Valencia, using the experience of the course directors in classroom courses developed since 2000. The approach used is the most approximate to what is done in a face-to-face course and we hope that it will be a good medium to work with and progress.



"Lessons" menu screen

The menu "**Lessons**" also includes **audiovisual material provided by companies in the photovoltaic sector**. This consists of material found on the Internet as well as audiovisual material recorded during the webinars organized in the UPV. These videos are included in the



unit that is most relevant to it. Their contents **are not assessed in the exams** (they are intended to expand knowledge in matters that may be of your interest). You can watch the videos whenever you want while you are doing the course. You can take notes on the slides that you will find in 'Resources', but the videos are not downloadable. If you have problems viewing the videos, it is recommended that you try accessing PoliformaT using another Internet browser: Google Chrome, Firefox, Safari, Internet Explorer, etc. If problems persist, start a new conversation in the **Forum / PoliformaT, organization, and structure of the course** / to find out if the problem is common to more students or if it is just a particular problem..

You can find a detailed description of the contents included in each of the modules in the file "PV_Intro_M0_PROGRAM_en.pdf" (site PV_Intro_**\Resources\). Below are summarized the contents of each of the modules that make up the course.

It is the student's OBLIGATION to have backup copies of the files on various media (DVD, hard disk,...). Once the studies have finished, there will be no access to this material and it will NOT be possible to resend it to the students in case of loss of data.

M1 - Introduction to Photovoltaic Systems

The first module of the course "Introduction to Photovoltaic Power Systems" begins with the description of the elements common to all photovoltaic installations: stand-alone and grid-connected systems. This first module develops the following contents:

- Cells, modules and photovoltaic fields.
- Solar radiation in photovoltaic systems.
- Supporting structures for photovoltaic installations.
- Electronic power converters in photovoltaic systems.

M2- Grid connected Photovoltaic Systems.

In the second module of the course "Introduction to Photovoltaic Power Systems" are developed the contents related with **photovoltaic systems connected to the electrical power network (grid-tied systems)**. The topics developed in this module are the following:

- Elements and topologies of grid-connected photovoltaic systems.
- Factors that affect the energy production of the installation.
- Grid-connected photovoltaic inverters.
- Design of photovoltaic systems with crystalline silicon and thin-film modules: selection of modules and inverters, wiring, protections, etc.



M3- Off-grid Photovoltaic Systems

The third module of the course "Introduction to Photovoltaic Power Systems" deals with **photovoltaic solar installations isolated from the power network (stand-alone systems)**.

The following contents are developed in the units of this module:

- Components and topologies of stand-alone photovoltaic systems.
- PWM and MPPT charge regulators, batteries and photovoltaic inverters for off-grid systems.
- Design of stand-alone photovoltaic systems connected in the DC bus, including the selection of photovoltaic modules, configuration of the photovoltaic field, charge regulator, inverter, wiring, protections, etc.
- Study of the worst month to design a stand-alone photovoltaic plant using the radiation data available at the location of the installation, and the energy demand from the electrical loads.

Teleconference sessions (webinars)

Some webinars have been planned using the multimedia classrooms available in the Lifelong Learning Center of the Universitat Politècnica de València. The **dates and timetables of the meetings** will be indicated in advance by using the tool **"Announcements"** in PoliformaT. The webinars will develop topics related to photovoltaic power systems. Attendance to webinars is voluntary and the exposed contents represent an **extension of the course contents**.

All sessions will be recorded (if there are no technical problems that impede it) and can be seen later in the "Lessons" menu. **Webinars** can be followed **via Internet** for the students registered in the course. Students who follow the webinar via Internet will have access to a chat for questions; while with the recorded session, it will be possible to use the **"Forums"** to raise questions about the exposed contents.

Webinars are usually done in the evenings, starting at 15:30 during the winter period (at 16:00 in summer time UTC/GMT + 2 h - <http://www.horlogeparlante.com/spanish/>). The webinars will be done in the classroom assigned in the Lifelong Learning Center and can be followed via Internet in the virtual classroom. The web address to access the virtual room address will be provided to students by using the "Announcements" tool. Webinars are scheduled to be between 2 and 3 hours in duration.

Consultations and Tutorials

Students in the online course "Introduction to Photovoltaic Power Systems" will have access to **queries and online tutoring** with the teachers through the PoliformaT tools called **"Forums"** and **"Messages"**. During the webinars, students can ask questions through the chat window available.



In the event of failure or error accessing PoliformaT and their tools, you can contact the organizers of the course to solve any doubt that you may have whilst carrying out the course:

Salvador Seguí Chilet

Dept. Ingeniería Electrónica

Edificio 7F – 3a planta (<http://www.upv.es/plano/directorio-es.pdf>)

Univ. Politècnica de Valencia

Camino de Vera 14

46022 Valencia

Spain

Tel: + 34 96 387 7007 Ext. 76077

Or sending an email to ssegui@eln.upv.es

By using the tool "**Forums**" the student can ask the **questions they wish regarding the contents** developed in each unit. These questions will be answered here by the teachers in the shortest time possible. The Forum is the common medium used to answer any **doubts about the course content**. The information found in the Forum is visible to all participants of the course. All registered students may participate in each of the threads developed in the '**Forums**' giving their own point of views and concerns, where all comments posted will remain registered.

PoliformaT has an internal mail system to allow communication between the participants in the course: teachers and students. By using the menu "**Messages**" students may contact with teachers and with other students **to address technical or non-technical queries as well as share information**. Internal mail allows you to choose the recipient of the mail, not being visible to the other participants. There is the possibility of sending collective mail to all participants of the course, only to professors, only to students or to individual recipients of your choice. For the mail to reach the teachers and directors of the course, you must include the recipients "**Admin Role**" and "**Professor Role**".

Internal mail can be used for all types of consultations, although it is preferred that questions about the course contents is done using the 'Forums' tool. Queries through forums and internal mail will be answered from Monday to Friday from 9:00 to 14:00 (schedule of Spain - UTC + 1, UTC + 2 summer time change with) within a period not exceeding the 48 h. Queries made during Saturdays, Sundays and public holidays in Spain, should be dealt with in a period of 48 hours from the next business day.

During the **special festivities** (Christmas, Easter, week of Fallas in Valencia, the month of August which is the official holiday period for Spanish universities) there will not be any academic activity. However, there will still be responses to the questions from students, but will take a larger response time than usual.



If delays occur in responses, higher than indicated above, it may be some kind of technical problem. In that case, if deadlines stretching and you get no reply, let us know of the situation by sending an e-mail to ssegui@eln.upv.es and mrecasen@eln.upv.es. Remember that you must include recipients "**Admin Role**" and "**Professor Role**" in your internal mail.

Evaluation and certification of studies

An **exam is scheduled to assess each module of the course**, which will be graded between 0 and 10. The exam will consist of a **test with multiple choice questions** covering the different parts of the course and you can do the exam as you study each unit. In Module 2 (Grid Systems) and Module 3 (Stand-Alone Systems) the exam is based on a **project of a photovoltaic system** that the student has to develop and will then be assessed through an online exam. You will find a Word document in 'Resources' with the description of the project to develop and the questions we may ask you in the exam. You can start doing the exam virtually from the beginning of the corresponding module. You will find information about the exams in Lessons.

All the **examinations are carried out via Internet** and it is not necessary to carry out any type of test at a given time and location. The tests can be carried out at any place with an Internet connection, using your hand notes and during several days, within the period indicated. Students will be able to ask questions about the contents of the exam through the "Forums" tool.

Remember that if you are going to perform the test in several sessions, new responses should be saved at each new session (remember to press the "save" button). After completely finishing the examination, you must choose the option "Submit for Grading".

Also remember that **all the exams of the course** are located in the site **PV_Intro_****.

The student has available **self-assessed exams** where they can assess their knowledge on the subject. The final exam of Module 1 is very similar to what is found in those self-assessed exams. Self-assessed exams do not count towards the grading of the course.

Once each exam is finished:

- The student will have access to the examination grade and be able to review the answers, seeing the mistakes made (Tools "**Gradebook**" and "Ratings" of PoliformaT).
- The student must save a copy of the exam in pdf including all comments (correct answers, evaluation, etc.) (use the option "Print" + "Save pdf").
- The student can continue with the next block until completing the course (which consists of 3 modules).



Grades obtained may be seen by the student in the "**Gradebook**" menu and all the marks of the final exams of each module will be used to determine the final grade of each student (average value of the 3 modules). If the final grade is equal to or greater than 5, an "**Achievement**" **certificate** will be issued by the **Lifelong Learning Center of the Polytechnic University of Valencia** (the grade does not appear on the certificate). Those which do not reach the minimum average scoring of 5 will not obtain a certificate. Certifications of the completed studies will be issued in the dates detailed in the main site of the course. With the issuance of each student's certificate, the course will be considered as concluded and the student will no longer have access to the training material.

From 1 June 2014 the Lifelong Learning Center is delivering only electronic certification that will be available on the intranet of each student in the Lifelong Learning Center. For any problem with the certificates, please contact certificados@cfp.upv.es detailing your problem. Also the Lifelong Learning Center has launched a web service for requesting documents that credit the undertaking of training activities carried out in the UPV. When requesting a certificate, you can download a digital document that comes with a code that allows the digital validation of this certificate.

The student record

It is the obligation of each student to verify that all the documentation provided for the registration is included in their personal file in the Lifelong Learning Center of the Polytechnic University of Valencia. At the address <https://www.cfp.upv.es/formacion-permanente/index/index.jsp?idioma=en&> you can access the web page below, where you need to click on the link "Training site" (left side menu):



The screenshot shows the 'Centro de Formación' website of the Universitat Politècnica de València. The left sidebar contains a menu with the following items: Inicio, Cursos y Jornadas, Másteres y otros títulos propios, Cursos a distancia, Congresos, Microweb Organización, **Training site** (highlighted with a red box and a yellow arrow), and Contact. The main content area features a banner for online master's courses, a list of upcoming courses and workshops, and a section for master's and diploma titles. The URL in the browser is <https://www.cfp.upv.es/formacion-permanente/index/index.jsp?idioma=en&>.

Then you can access your personal page using your login information. The screen that appears is as follows;

The screenshot shows the login page for the 'Centro de Formación' website. It features a login form with fields for 'User:' and 'Password:', an 'Enter' button, and links for 'New user' and 'I forgot my password'. A red box highlights the 'Access CFP user and password' button. To the right, there is a section for 'If you belong to the UPV, sign in here' with a 'Access via UPV password' button. The URL in the browser is <https://poseidon.cfp.upv.es/portal-formacion/registro/privada.jsp?idioma=en&cabecera=false&>.

After gaining access, you will find a screen with all the data related to the record of the student in the Lifelong Learning Center. You can modify the language used in the menus in the upper menu showed below:



☐ Inicio
☐ Mis actividades
☐ Currículum
☒ Oferta formativa
☒ Enlaces de interés
☒ eCertificado

Bienvenido *****

e-mail and ID

[Ver todos mis datos](#)

Cursos que te pueden intere:

Horas de docencia disponibi

75h

Within the intranet, it is possible to review all documentation associated with each student, including payments made, the request of invoices for these payments, certificates, etc.: (Note: The page or parts of the page may not be available in English). By clicking on the link: "See all my data" we can access or modify to all our personal and professional information.



UPV education

Exit UPV education

☐ Index
☐ My activities
☐ Curriculum
☒ Courses offer
☒ Enlaces de interés
☒ eCertificado

Welcome *****

your name

Courses that may interest you

Horas de docencia disponibles

75h

e-mail and ID number

[See all my data](#)

Activity	Start D.	Type	Role	State
DIPLOMA DE EXTENSIÓN UNIVERSITARIA EN ENERGIA SOLAR FOTOVOLTAICA	1/10/14	CFP	Student	Accepted
ENERGÍA SOLAR FOTOVOLTAICA – UNA APUESTA DE FUTURO SOSTENIBLE.R.2	22/11/14	CFP	Student	Accepted
PHOTOVOLTAIC IN SPAIN (Group 1)	18/06/15	CFP	Teacher	Provided
INTRODUCCIÓN A LA ENERGÍA SOLAR FOTOVOLTAICA	15/09/14	CFP	Student	Canceled

[View all my activities](#)

June 2015

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Wednesday 10 June 2015

The students of the online course "Introduction to Photovoltaic Power Systems" will have to verify that their file contains the correct personal data: full name, address, email, etc. The existing address will be used for sending documents whilst the email is used to communicate with the student. It is convenient to use an e-mail address that does not depend on the institution in which you are at, whilst undertaking the course (company, University, etc.). It is **important to always have both fields** updated, even if the course has finished (you will still have access to the intranet of the Lifelong Learning Center, after finishing the course).

Please, be sure to enter your name and surname as they should appear on the certificate (which will be issued at the end of your studies, on the dates indicated within the course). If you need to change any of your name or surname, you must send to cfp@cfp.upv.es a copy of an official document with the correct data, including a screen shot of the CFP login page where your data appears (as in the figure above).



Surveys

To evaluate the online training provided, there will be a **survey at the end of the course**. The Polytechnic University of Valencia uses a type of evaluation from the imparted training, which is done through targeted surveys:

- To participating teachers.
- To the student.
- The teaching platform (PoliformaT).
- The contents of the course.

Any comment, suggestion, opinion or point of view that you want to give about the organization or content of the online course in Photovoltaic Power Systems will be welcomed and taken into account. You can do it through the internal mail in PoliformaT or sending an email to ssegui@eln.upv.es.

Continuation of studies

If you want to expand your knowledge in photovoltaic technology you can complete your studies with the **Diploma of Specialization in Photovoltaic Power Systems**. With 30 ECTS (equivalent to 300 classroom hours and 750 hours of student work.) and taught in Spanish, the diploma is offered in online format by the Polytechnic University of Valencia. In www.cursofotovoltaica.com you can find more information about this course.

If you're going to register in the Diploma of Specialization in Photovoltaic Energy Systems, make sure to tell us that you have previously done the online course in Introduction to Photovoltaic Power Systems to give you a **discount on the registration**. The price of the Diploma of Specialization in Photovoltaic Energy Systems is €1500, with a special price of €1200 for specific groups (students UPV, unemployed).

If you want to expand your knowledge in the area of renewable energies and energy efficiency you can complete your studies with specific training (taught in Spanish) offered through the Lifelong Learning Center:

- Practical Photovoltaic Systems: includes 25 hours of face-to-face training in the UPV and some online tasks related with the practical parts (ssegui@eln.upv.es).
- Wind Energy (open all year - online figimeno@eln.upv.es).
- Energy Efficiency (open all year - online - figimeno@eln.upv.es).

The Course "**Practical Photovoltaic Systems**" has 4.5 ECTS and part of it includes face-to-face time, whilst other parts are online. The face-to-face parts are developed in the Nexus photovoltaic plant in the UPV during 1 week in April/May (25 hours of work with teacher). **Students who have**



completed the Diploma of Specialization in Photovoltaic Energy Systems (in any edition) **or who are studying any of the modules** at the time of the practice week, will have a reduced enrollment of 200 € which will include insurance and material for the practical work. For the students who can travel and stay in Valencia during the scheduled dates for the class activities, the following is available:

- A photovoltaic plant of 4 kW_{pk} of crystalline silicon modules and 1 kW_{pk} of amorphous silicon modules located on the roof of the Nexus building (building 6G) where activities will be undertaken related to the installation, starting up and monitoring of a grid connected system.
- A computer classroom of the Lifelong Learning Center where the students will carry out activities to process and analyze data acquired in the photovoltaic plants of the Polytechnic University of Valencia (stand-alone and grid-connected). This will help solve doubts from the practical cases studied.

There are 25 hours spent working on the photovoltaic plants of the UPV (if weather conditions allow) and in the computer classroom (with data stored at our installations). The sessions can take place in the morning or in the evening, according to the agenda of the external teachers who teach in some of the classes. This will be determined a few weeks before the week of practices. During the week of practices, it will be promoted with the participating students an open **debate on the topics raised**. There will be a specific forum for each topic raised, so that students can exchange ideas on the best solution to each question and reflect on possible solutions.

For students who cannot attend the practice week developed at the Polytechnic University of Valencia, we have prepared material that will allow equivalent work to be carried out:

- Visits to the facilities will be replaced by virtual guided tours (video Polimedias) which will be available in "**Lessons**" of PoliformaT.
- Exercises developed in the computer classroom can be carried out in their own computers since there is no need of any special software.

Websites with job offers

When we receive job offers in the photovoltaic sector, we inform the students by means the Announcements tool in PoliformaT.

There are several web pages that show job offers in photovoltaic systems. Apart from the each company's own offers (offered in their newsletters or web pages), there are websites dedicated in the sector of renewable energy and photovoltaic systems. We include some of them:

- <http://www.renovetec.com>, there is a section of offers of employment.
- <http://www.lrena.org/jobs/jobs.aspx? & mnu = cat & PriMenuID = 13 & CatID = 58>
- <http://jobsingreen.eu/g/>
- <http://www.solarjobs.com/>



- <http://www.seia.org/solar-jobs>
- <http://www.monster.com/>

Problems with access to the PoliformaT platform.

In case of any problem with the platform, remember that in the PoliformaT home page (<https://poliformat.upv.es/portal/site/!gateway-en/tool/9d61d2a6-5102-4570-bdac-c92c458eac77>) there is an icon that indicates "ISSUES" in which when you click on it, a form comes out that you have to fill in with your data and the problem in question. If after 1 week you see that you do not receive any mail from the UPV information center, you can send me a copy of the problem to ssegui@eln.upv.es.

Here is a description of some of the problems we have encountered:

Access has been cut off after you have been working for some time.

If you remain more than 45 minutes (approx.) without activity in PoliformaT, you will be automatically logged out and you will have to log in again.

It is also possible that the platform will be closed because due to synchronization tasks between different servers in the computing center, PoliformaT is not operational every day between 4:30 and 5:00 a.m. (Spanish time). During this time, it will not be possible to access the platform and those who were already on the platform will no longer be able to access it.

Access has been cut off after one minute inside.

This case occurred to a student taking the course from a post-Soviet state in Central Asia, but it has also happened to students in Spain.

The problem is that the IP address from which the session is established with PoliformaT was not constant. This is probably due to the way your internet provider works.

When PoliformaT establishes a session, it notes the IP address from which it was created and as soon as it detects that the session tries to be used from a different IP address than the original one, it closes the session abruptly, so when trying to perform any action, it asks us again to identify ourselves.

You can check the IP with which you go outside from <http://www.cualesmiip.com/> (or other web pages, as <https://www.iplocation.net/find-ip-address>), as it shows the IP from which you are connected together at the moment.

Since maintaining a stable IP is a prerequisite for using PoliformaT, you should talk to your Internet provider or find another one without this problem.

if you are unable to solve the problem and wish to receive a refund, you can request it on the CFP intranet.