



# Fraunhofer

ACADEMY

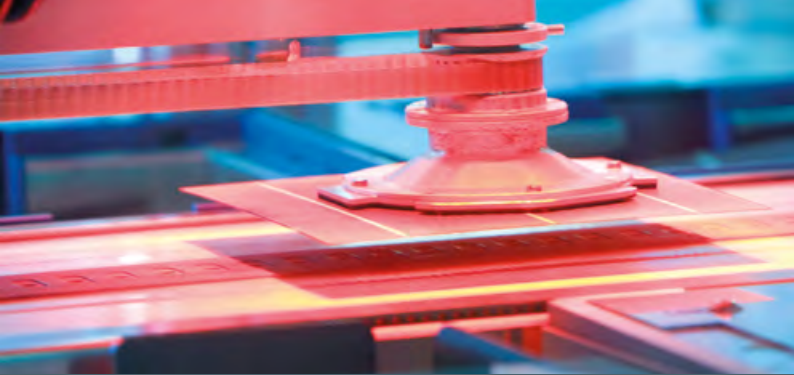
Certificate of Advanced Studies (CAS)

## CAS 3 – CRYSTALLINE SILICON PHOTOVOLTAICS

STEP UP YOUR PROFESSIONAL SKILLS  
WITH AN ACCREDITED CERTIFICATE

Offered by

UNI  
FREIBURG



## LEARN FROM GERMANY'S LEADING EXPERTS IN SOLAR ENERGY



Come and join the worldwide growing solar community and become part of our successful and renowned society of solar scientists and engineers. We offer continuing education courses and a Master of Science degree program which will allow you to gain scientific and technical knowledge in solar energy. You will study part-time with our renowned experts in solar energy through e-learning and online courses as well as hands-on workshops in the facilities of the Fraunhofer Institute for Solar Energy Systems ISE.

Our program provides not only in-depth knowledge and a suitable and flexible learning environment for working professionals but also enjoyable events and networking meetings with R & D and industry experts. Thanks to our enthusiastic and well-versed lecturers, I am convinced that you will maximize your knowledge in solar energy and become an expert yourself.

Yours faithfully

Prof. Dr. Stefan Glunz

Program Director Master of Science Solar Energy Engineering

## PROGRAM OVERVIEW AND TARGET GROUP

### Study Part-Time – From Anywhere In the World

You want to improve your skills and your knowledge in the field of solar energy – and at the same time continue working in your job? This Certificate program is ideal for professionals like you.

### Become an Expert in Crystalline Silicon Photovoltaics

Learn about the whole process – from feedstock to solar modules – you will understand the whole value chain of this important technology. Learn everything from the physical basics to the latest industrial standards.

### New Course Design

The instructional design follows a problem based interactive approach. The lessons and online meetings are combined with research tasks in the lab workshop. Interactive elements in the online lesson allow for a continuing control of your learning progress.

### Our Study Offer Is Made For You

This CAS is the ideal choice for people with:

- Existing knowledge in the energy sector, or
- Professional experience in the photovoltaics industry



## CAS – ACCREDITED PROGRAMS FROM PRESTIGIOUS INSTITUTIONS

“90% of all solar cells are fabricated from crystalline silicon.” *Prof. Dr. Stefan Glunz, Fraunhofer Institute for Solar Energy Systems ISE*

### What is a Certificate of Advanced Studies?

A Certificate of Advanced Studies (CAS) is an advanced training program which is compliant with the European Credit Transfer System (ECTS).

These standards secure the high quality of CAS programs as well as their comparability and recognition across educational institutions. Thus it is possible to combine CAS programs from the same or different institutions from Germany and Switzerland to form a more extensive degree in a modular fashion.

### CAS Programs in Solar Energy Engineering

Our CAS course offers are the result of a long-standing scientific cooperation between the University of Freiburg and the renowned Fraunhofer Institute for Solar Energy Systems ISE.

Studying one of our CAS programs gives you access to expert knowledge from a world-leading research institute and awards you with a certificate of one of Germany's top universities.

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Our Certificate programs are designed to be a convenient way for you to study online while working. All our CAS programs can be completed within 6 or 12 months and are awarded with 10 ECTS each.

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### The Course: Crystalline Silicon Photovoltaics

**8 ECTS**

The course conveys the state-of-the-art technology for fabrication of crystalline silicon solar cell modules starting from quartz sand. Main topics are the solar cell wafer fabrication, the working principle of the Al-BSF and PERC solar cell concept, as well as advanced high efficiency cell concepts, inline fabrication of solar cells and solar modules. The course involves necessary simulation and characterization approaches to understand the limitations of solar cell devices as well as currently discussed trends in research and technology.

### The Lab Workshop: Hands-on Solar Cell Processing

**2 ECTS**

Experience a two-day Lab Workshop in the state-of-the-art facilities of Fraunhofer ISE in Freiburg at the end of your course.

**Lecturers:** All lecturers are respected scientists in solar cell research from Fraunhofer ISE. In elective online meetings an expert is available for your personal questions.

**Dr. Martin Schubert**, Head of Department Characterization and Simulation

**Prof. Dr. Stefan Glunz**, Director, Division Photovoltaics – Research

**Dr. Ralf Preu**, Director, Division Photovoltaics – Production Technology

**Dr. Harry Wirth**, Director, Division Photovoltaics – Modules and Power Plants

**Dr. Jochen Rentsch**, Head of Department Production Technology – Surfaces and Interfaces



## GENERAL INFORMATION

**Start:** Mid April

**Duration:** 6 months

**Credits required:** 10 ECTS

**Program Fee:** € 2500

**Participation requirements:**

- Basic knowledge of the working principals of solar cells
- English language proficiency
- Ability to travel to Germany (visa requirements) for a lab training minimum of 2 days in Freiburg

**Study Format:**

- E-learning and online video lectures accompanied by readings, exercises and online meetings with tutors and lecturers
- Written exams (120 minutes) in a study center close to where you live
- Mandatory attendance in a hands-on workshop (2 days) at Fraunhofer ISE, Freiburg, Germany

**Degree:** Certificate of Advanced Studies (CAS)

**Application:** [www.studysolar.uni-freiburg.de](http://www.studysolar.uni-freiburg.de)

In scientific cooperation with



## YOUR BENEFITS AT A GLANCE

- »»» Get first-hand knowledge on silicon solar cell technologies from leading researches from Fraunhofer ISE and Freiburg University
- »»» Explore the state-of-the-art technology for fabrication of crystalline silicon solar cells and modules
- »»» Get an understanding of the working principle of the Al-BSF and PERC solar cell concept, as well as advanced high efficiency cell concepts.
- »»» Experience a two-day Lab Workshop in the state-of-the-art facilities of Fraunhofer ISE in Freiburg at the end of your course
- »»» Advance your professional career by learning from Germany's leading experts in solar energy
- »»» Keep working in your job and enjoy the flexibility of studying an online, part-time Certificate Program
- »»» Earn an accredited Certificate of Advanced Studies (CAS) from two prestigious institutions



## DO YOU HAVE ANY QUESTIONS FOR US?

About content related issues?

About the registration process/general issues?

About further similar programs?

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