

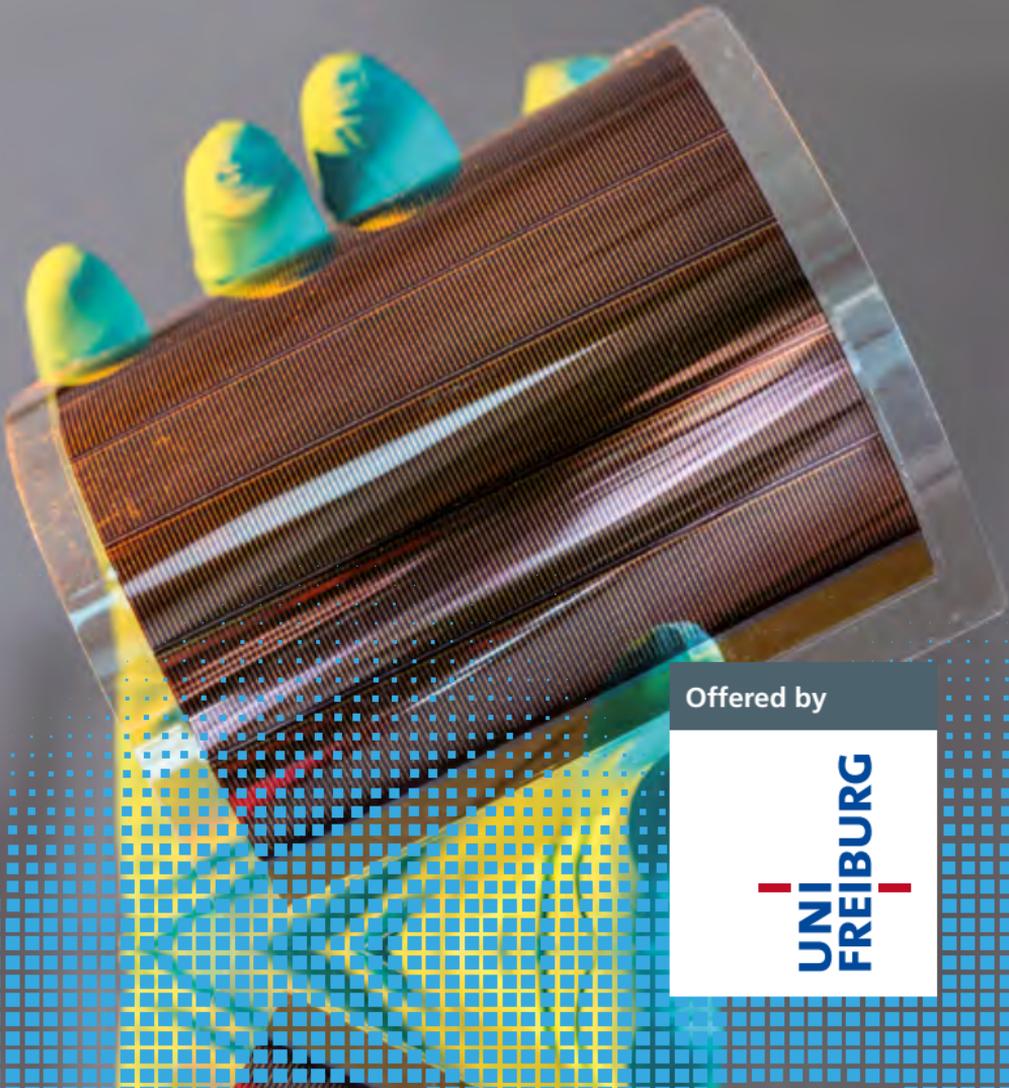


**Fraunhofer**  
ACADEMY

Certificate of Advanced Studies (CAS)

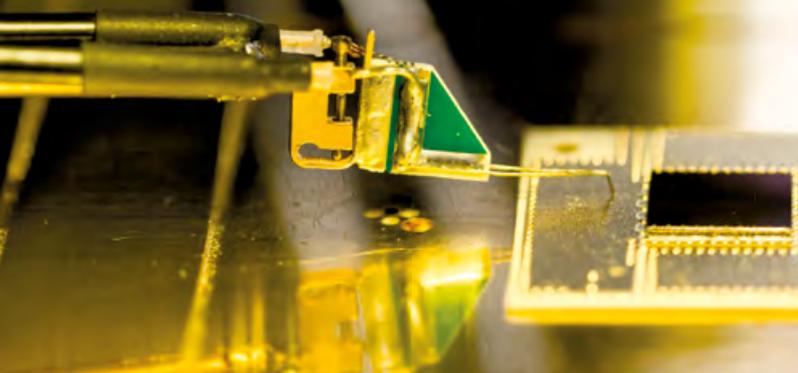
## CAS ST – ADVANCED SOLAR CELL TECHNOLOGIES

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

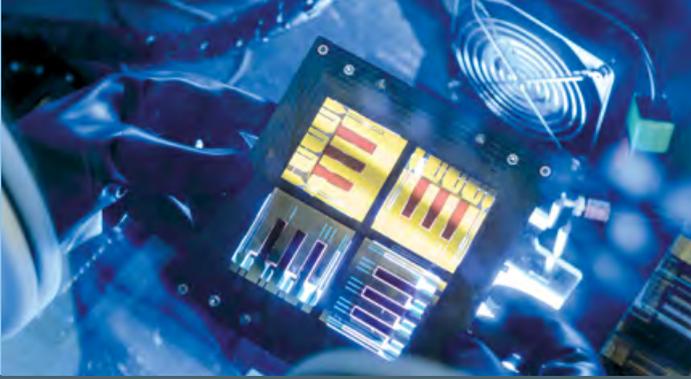
You want to improve your skills and your knowledge in the field of solar energy – and at the same time continue working in your job? This Certificate program is ideal for professionals like you. During the last decade we created an innovative and flexible online learning environment – adapted to your needs.

### Become an Expert in Advanced Solar Cell Technologies

You will learn from Germany's leading experts in solar energy. This 10-credit certificate provides a comprehensive understanding of the different types of thin-film solar cells like Si-based, CIGS, and CdTe thin-film, of the modules and their production. Their role in the PV market and the specific applications in which they excel are discussed in detail. You will learn about the field of high concentration photovoltaics and study III-V solar cell approaches. New and emerging concepts of solar cells like organic and perovskite will be introduced and discussed.

### Our Study Offer Is Made For You

This CAS is an ideal program if you are a working professional with:  
– A good understanding of the physical principles of solar cells



## CAS – ACCREDITED PROGRAMS FROM PRESTIGIOUS INSTITUTIONS

“Reaching efficiencies beyond the Shockley–Queisser limit.” *Dr. Gerald Siefer, 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.

---

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.

---

#### ST1.1 – Inorganic Thin-Film Solar Cells

4 ECTS

Lecturer: **Prof. Dr.-Ing. Michael Powalla** | Head of Photovoltaics Division at Centre for Solar Energy and Hydrogen Research (ZSW).

#### ST1.2 – III-V Solar Cells and Concentrator Systems

3 ECTS

Lecturer: **Dr. Gerald Siefer** | Head of Group “III-V Cell and Module Characterization” at Fraunhofer ISE.

#### ST2.1 – New Concepts for PV Energy Conversion

2 ECTS

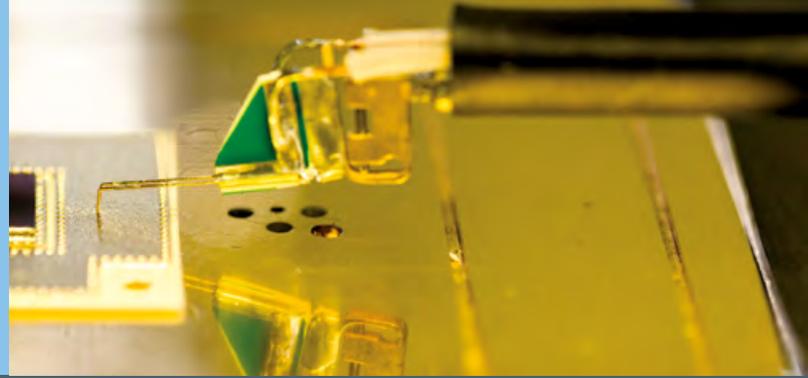
Lecturer: **Dr. Uli Würfel** | Head of the Department “Organic and Perovskite Photovoltaics” at Fraunhofer ISE.

#### ST2.2 – Advanced Solar Cell Processing

1 ECTS

Lecturer: **Dr. Martin Heinrich**  
Head of Team “Module Efficiency and New Concepts” at Fraunhofer ISE.

This CAS provides a comprehensive understanding of thin-film solar cells, modules and their production as well as their role in the PV market. Participants gain a wide overview about existing concepts to overcome the thermodynamic limit for single junction solar cells, the so-called third generation photovoltaics. New techniques in solar cell production will be introduced.



## GENERAL INFORMATION

**Start:** Mid October

**Duration:** 6 months

**Credits required:** 10 ECTS

**Program Fee:** € 2500

**Participation requirements:**

- Existing Knowledge of semiconductor physics and solar cells
- English language proficiency

**Study Format:**

- E-learning and online video lectures accompanied by readings, exercises, online-self-assessments and online meetings with tutors and lecturers
- Three written exams (60, 45 and 30 minutes) in a study center close to where you live
- A seminar that includes the preparation of a handout and a final oral presentation

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

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

In scientific cooperation with

 **Fraunhofer**  
ISE

 **UNI**  
**FREIBURG**

## YOUR BENEFITS AT A GLANCE

- »» Gain a comprehensive understanding of the different types of thin-film solar cells, modules and their production
- »» Learn about III-V solar cells and concentrator systems
- »» Get an overview on the different kinds of new types of solar cells like organic and perovskite
- »» Learn about new techniques in solar cell production which are likely to prevail in the next coming decade
- »» 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?

### **Prof. Stefan Glunz**

Program Director  
Fraunhofer Institute for  
Solar Energy Systems ISE  
contact@studysolar.  
uni-freiburg.de

### **Philipp Bucher**

Program Coordinator  
University of Freiburg  
P +49 761 203-7213  
contact@studysolar.  
uni-freiburg.de

### **Lena Kurtz**

Program Manager  
Fraunhofer Academy  
P +49 89 1205-1526  
lena.kurtz@  
zv.fraunhofer.de

[www.academy.fraunhofer.de/solar-energy-engineering](http://www.academy.fraunhofer.de/solar-energy-engineering)  
[www.studysolar.uni-freiburg.de](http://www.studysolar.uni-freiburg.de)