

# Joint European Summer School on Fuel Cell, Electrolyser, and Battery Technologies

## JESS 2021

06 – 11 September 2021  
(Introductory Modules)

and

13 – 18 September 2021  
(Advanced Modules)

Vouliagmeni, Athens, Greece



## Basic Information

### Participation fees:

1.595,- € per course and person

This covers accommodation in single room (double room occupancy = 1.395,- € per person), including all tuition fees and taxes, as well as:

- full board for seven nights,
- coffee breaks,
- a banquet on the Friday, and
- an excursion on the Wednesday.

Accompanying persons (in same double room, not attending lectures) pay 650 € including all of the above.

Please register by 15 Aug 2021 to secure your place on the School (cut-off date).

For registering and regular updates and information (**also including COVID-19 arrangements**), please go to our web site:

<http://www.jess-summerschool.eu>

Contact for all enquiries:

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JESS is organised by:



If you want to sponsor this event, please contact Mr. Hooper.

### Organising committee:

Prof. Robert Steinberger-Wilckens, U Birmingham  
Prof. Jens Oluf Jensen, DTU Energy  
Prof. Rüdiger-A. Eichel, FZ Jülich GmbH  
Prof. Vladimir Molkov, Ulster University

### Scope and target:

The Joint European Summer School (JESS in short) dates back to 2004 when the first Summer School was organized in Greece. By now, 17 events have been successfully organized.

Participants can select from seven individual course modules run in the two weeks:

Week 1 offers three comprehensive introductions aimed at graduate and PhD students and young professionals within the fields of low and high temperature fuel cells & electrolysis, and in battery technology.

Week 2 in 2021 offers three advanced modules for students and professionals with a few years of experience. These cover the fields of Fuel Cell Electric Vehicles, Innovation Management & Business Development, and Hydrogen Safety.

All lectures will be presented by highly acclaimed experts from universities, research centres, and industry with long-standing experience in teaching. All details of the courses and information on lecturers can be found on the JESS website.

The courses are accredited at DTU and RWTH Aachen (for week 1), and University of Birmingham (week 1 & 2). Upon successfully taking the optional final exams, students will receive 3 ECTS credit points per course. 5 ECTS points will be attributed if additional work is completed.

**Lecture language:** English.

Slides and information will be available to participants via a secure download area on the JESS website during and after the Summer School.



The 18<sup>th</sup> edition of the Joint European Summer School – JESS2020 - will again take place in Vouliagmeni, near the beautiful city of Athens on the coast of the Aegean Sea. It will provide seven high level courses on selected topics in fuel cell, electrolyser, battery and related technologies.

JESS addresses newcomers to the field, graduate students, and young professionals working at the forefront of fuel cell, electrolyser, battery, and hydrogen technologies.

Week 1 of the Summer School will focus on:

#### **Introduction to Fuel Cell, Electrolyser, and Battery**

**Technologies:** starting from the fundamental principles of electrochemistry and thermodynamics the entire spectrum of materials, design and balance of plant will be covered both from a scientific and an engineering point of view. The courses will be augmented by more general lectures on various aspects of the technology.

Week 2 of the Summer School addresses students with one or two years of experience. It focuses on:

The **FCEV** module will offer insight into design and technology of fuel cell driven vehicles to students with a background in the basic technology. The **IMBD** module will be run by senior management and finance lecturers. The **H<sub>2</sub> Safety** module will introduce the issues encountered in hydrogen handling as is run by research centre. The lecturers are highly experienced and include senior researchers from the automotive field, including Prof Ferdinand Panik, the former director of Daimler Research and one of the first to promote fuel cell drive trains.

In addition to the lectures, the participants will be asked to join in student projects, applying the course content to case studies to be presented at the end of the week.

### Tentative Programme Schedule

JESS comprises of seven independent course modules as shown below that can be booked separately. Students choose the specific course they want to attend during registration.

#### Week 1:

<i>Introduction to Electrochemistry and Thermodynamics Introduction to Solid State Chemistry and Ionics</i>		
<i>Introduction to SOFC / SOE</i>	<i>Introduction to LT Fuel Cells &amp; Electrolysers</i>	<i>Introduction to Batteries</i>
<ul style="list-style-type: none"> <li>• <i>materials: electrolytes &amp; electrodes</i></li> <li>• <i>cell and stack design</i></li> <li>• <i>stack materials</i></li> <li>• <i>manufacturing</i></li> <li>• <i>characterisation</i></li> <li>• <i>degradation</i></li> <li>• <i>system technology</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>materials: electrolytes &amp; electrodes</i></li> <li>• <i>cell and stack design</i></li> <li>• <i>manufacturing</i></li> <li>• <i>characterisation</i></li> <li>• <i>degradation</i></li> <li>• <i>system technology</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>materials: electrolytes &amp; electrodes</i></li> <li>• <i>cell and stack designs</i></li> <li>• <i>manufacturing</i></li> <li>• <i>characterisation</i></li> <li>• <i>modelling</i></li> <li>• <i>degradation</i></li> <li>• <i>system technology</i></li> <li>• <i>beyond Lithium</i></li> <li>• <i>metal-air &amp; solid state batteries</i></li> </ul>
<ul style="list-style-type: none"> <li>• <i>power to gas, power to fuel</i></li> </ul>		

#### Week 2:

<i>Fuel Cell Vehicles</i>	<i>Innovation Management &amp; Business Development</i>	<i>Hydrogen Safety</i>
<ul style="list-style-type: none"> <li>• <i>vehicle design</i></li> <li>• <i>hybrid vehicles</i></li> <li>• <i>electric drivetrains</i></li> <li>• <i>vehicle batteries</i></li> <li>• <i>life cycle and emissions</i></li> <li>• <i>market introduction</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>spinning out an innovative business</i></li> <li>• <i>financing a business</i></li> <li>• <i>intellectual property protection</i></li> <li>• <i>ideation, creativity, and innovation</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>introduction to hydrogen safety</i></li> <li>• <i>hydrogen storage</i></li> <li>• <i>materials and hydrogen</i></li> <li>• <i>incident handling</i></li> <li>• <i>incident prevention</i></li> <li>• <i>standards</i></li> </ul>