



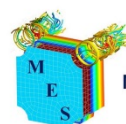
*Joint European Summer School on Fuel Cell,  
Electrolyser, and Battery Technologies  
JESS 2017*

***Hydrogen Safety***

*18 – 22 September 2017  
Hotel Amarilia,  
Vouliagmeni, Athens, Greece*



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The **2nd week** of the Joint European Summer School JESS 2017 brings high quality graduate level courses on selected topics of vehicle technology, innovation & business development, safe handling of hydrogen, and modelling. This series of summer schools has been ongoing since 2004 and targets an audience of **university students (MSc and PhD levels)** and **post-doctoral researchers**. We also welcome **more experienced researchers and engineers** wishing to expand their general knowledge, for instance, to suit a newly acquired position or collect credits for Continuous Professional Development (CPD). The course content is tailored to the needs of a diverse audience: newcomers to the field, experienced students, and young professionals working at the forefront of fuel cell and hydrogen applications.

The courses are accredited at the University of Birmingham and each **carry 3 ECTS** points.

The previous week (Week 1) will offer three introductory courses to high and low temperature fuel cells and electrolyzers, and battery technology (please refer to the separate programme). The two weeks are conducted independently of each other and students can choose the courses most appropriate to their studies.

### The **Hydrogen Safety** module

offers in-depth insight into a vital, but often underrepresented and misunderstood topic: the safe handling of hydrogen. Every fuel cell vehicle will require a hydrogen tank and hydrogen will therefore become a 'normal' commodity in the near future. Nevertheless, many people are not accustomed to its handling and again and again safety issues are raised. Being aware of the 'real' hazards (versus the imagined ones), how to handle them, and what precautions to take makes the case of hydrogen and fuel cells stronger and allows an educated approach to hydrogen and fuel cell system design.

The course not only addresses students active in the area of fuel cell and hydrogen technology, but also first and second responders, government and administrative staff involved in granting building and operating permits for hydrogen installations, and industry safety managers. It draws from a strong basis of academic and industrial expertise.

Topics covered in lectures, exercises, round-table discussions, case studies, and Q&A sessions will include, amongst others:

- rules, codes, and standards,
- effects of hydrogen releases, fires, and explosions,
- handling liquid hydrogen,
- handling hydrogen in workshops, including Toyota Mirai first-hand experience, and
- safety strategies and engineering solutions.

The module draws on the knowledge and expertise of high-profile lecturers currently working at the leading edge of research and development in Europe and associated to universities, European and national research centres, and industry. All of them have been active in safety, standardisation, and incident research for many years and lend the module their vast body of professional experience.:

Prof Vladimir Molkov	Ulster University, UK
Dr Pietro Moretto	Joint Research Centre, Petten, The Netherlands
Dr Dmitriy Makarov	Ulster University, UK
Vincent Mattelaer	Toyota Europe, Brussels, Belgium
Dr Stuart Hawksworth	Health & Safety Laboratory, UK

You can find brief CV's of the lecturers, programme updates, and information on past events on the JESS web site: <http://www.jess-summerschool.eu/JESS-2017> as well as the general brochures for JESS 2017.

**JESS 2017****Hydrogen Safety**tentative programme  
last changed 26/03/17P ... plenary lectures (all students), St ... student presentations,  
H ... specialised lectures**Sunday 17/09/2017**

20:30 dinner

**Monday 18/09/2017**

P.01	08:30	Welcome and General Introduction	Robert Steinberger-Wilckens (U Bham)
	09:00	Sustainable and Renewable Energy Future	Robert Steinberger-Wilckens (U Bham)
	09:45	coffee break	
P.02	10:00	Introduction to Fuel Cell Vehicles & Markets	Ferdinand Panik (U Esslingen)
	11:15	break	
P.03	11:30	Introduction to Hydrogen Safety	Vladimir Molkov (Ulster University)
	13:00	lunch	
H.01	16:00	European RCS Relevant to Hydrogen Systems and Infrastructure	Pietro Moretto (JRC)
	17:30	coffee break	
P.04	18:00	Safety when working on FCV's	Vincent Mattelaer (Toyota Europe)
P.05	19:30	Introduction to the Students' Project	Robert Steinberger-Wilckens (U Bham)
	19:45	welcome reception (bar)	
	20:15	dinner	
St.01	21:15	Students' Presentations I	students

**Tuesday 19/09/2017**

H.02	08:30	Hydrogen Releases and Ventilation	Vladimir Molkov (Ulster University)
	09:45	coffee break	
H.03	10:00	Hydrogen Sensors for Safety	Pietro Moretto (JRC)
	11:15	break	
H.04	11:30	Ignition and Jet Fires	Dmitriy Makarov (Ulster University)
	13:00	lunch	
H.05	16:00	FCV Workshops, Tools and Working Procedures	Vincent Mattelaer (Toyota Europe)
	17:15	coffee break	
P.06	17:30	Developing Fuel Cell Businesses	James Wilkie (U Bham)
	18:15	break	
St.02	18:30	Students' Presentations II	students
	20:00	dinner	

**Wednesday 20/09/2017**

P.07	08:30	Mirai product knowledge	Vincent Mattelaer (Toyota Europe)
	09:45	coffee break	
H.06	10:00	Pressure Effects of Indoor Releases	Dmitriy Makarov (Ulster University)
	11:15	break	
H.07	11:30	Hazard Distances from a Blast Wave	Vladimir Molkov (Ulster University)
	13:00	lunch	
	15:00	excursion	
	21:00	dinner	

**Thursday 21/09/2017**

H.08	08:30	Dealing with Liquefied Hydrogen	Stuart Haworth (Health & Safety Lab, UK)
	09:45	coffee break	
H.09	10:00	Safety Strategies and Engineering Solutions for Storage Protection	Dmitriy Makarov (Ulster University)
	11:15	break	
H.10	11:30	Hydrogen Safety Design: Case Studies	Stuart Haworth (Health & Safety Lab, UK)
	13:00	lunch	
H.11	16:00	Fast Filling Scenarios and Pre-Cooling	Pietro Moretto (JRC)
	17:00	coffee break	
H.12	17:15	Performance-Based Hydrogen Safety Codes and Standards	Stuart
	18:30	break	
St.03	18:45	Student project time	students
	20:00	dinner	

**Friday 22/09/2017**

H.13	08:30	Effect of safety on socio-economics of hydrogen-powered vehicles	Dmitriy Makarov (Ulster University)
	09:45	coffee break	
H.14	10:00	Peculiarities of hydrogen safety regulations in different countries	Stuart Haworth (Health & Safety Lab, UK)
	11:15	break	
H.15	11:30	Recent advancement in hydrogen safety and testing facilities at JRC	Pietro Moretto (JRC)
	13:00	lunch	
St.05	16:00	ECTS Exam (optional)	
	17:00	coffee break	
St.06	17:15	Students' projects presentations	James Wilkie (U Bham)
	18:45	break	
P.08	19:00	Farewell	Robert Steinberger-Wilckens (U Bham)
	20:30	Gala dinner	

# Joint European Summer School on Fuel Cell, Electrolyser, and Battery Technologies – **Registration Form**

Fuel Cells Electric Vehicles ☐

Innovative Technology Business Development ☐

Hydrogen Safety ☐

The Modelling Master Class ☐

Hotel Amarila (<http://www.amarilia.gr>)  
17 – 23 September 2017, Vouliagmeni (Athens), Greece

Deadline for registration: **31 August 2017**

Title	
First name	
Last name	
Gender	Male <input type="checkbox"/> Female <input type="checkbox"/>
University/Institution/Company Name	
Street / P.O. Box	
Postal code	
Town/City	
Country	
V.A.T. number (if applicable)	
Phone	
E-mail :	
Athens arrival date and time (optional)	
Athens departure date and time	
Please note any <u>special dietary requirements</u> , disabilities etc. that we may need to know about	
standard rate (all rates incl. Greek VAT)	The registration fee covers tuition fees, accommodation for six nights, full board (meals and coffee breaks), the drinks reception, end-of-week banquet, and the excursion.
<input type="checkbox"/> single room 1.340 €	
<input type="checkbox"/> double room 1.150 € per person	
Shared with:	
<input type="checkbox"/> accompanying person (no lectures, shared room) 550 €, name:	

Place & date ..... Signature .....

PLEASE RETURN BY E-MAIL OR FAX TO

Mrs Manuela Drape-Stathoglou  
[manuela@panhellas.gr](mailto:manuela@panhellas.gr), Fax: +30 2810 300848

Or follow the registration link on the Summer School web site  
<http://www.jess-summerschool.eu/JESS-2017>

You will then receive a confirmation and an invoice for the registration fee.