



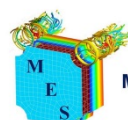
*Joint European Summer School on Fuel Cell,
Electrolyser, and Battery Technologies
JESS 2017*

The Fuel Cell Modelling Master Class

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



sponsored and supported by



Multiphysics Energy Solutions
3D Simulation Assisted R&D | Consulting

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 Fuel Cell and Systems Modelling Masterclass

offers a combination of introductory theory, student exercises, and student project presentations. It gives students insight into different modelling approaches and software platforms in order to broaden their choice of modelling and programming tools. The FCMMC module aims at students already involved in fuel cell and electrochemical device modelling. It will provide them with insight into the basic science behind modelling software packages and explain the variety and applicability of packages available, including open source code. Topics range from mathematical basics and thermodynamical calculations to fluid flow (CFD) and finite element (FEM) analysis, and 0d to 3d modelling. One key point of interest will be multiphysics modelling. All this serves to give students already active in modelling a better view of what potential alternatives and valuable additions there might be to their own project approach.

In the second half of the module students are required to present their own modelling and simulation projects and have the opportunity to receive feedback and advice from peers and senior lecturers. The module offers a platform to discuss modelling problems encountered and potentially generate new approaches and solutions from discussions with peers and renowned experts in the field of modelling and simulation.

The module will be found useful both by students involved in the fuel cell & hydrogen field itself, for instance working on a PhD in the area, but also other students and employees using modelling tools but not having the adequate working environment to discuss software and programming problems with peers. The module addresses PhD students with advanced knowledge and projects in engineering (fuel cells, hydrogen, electrochemistry etc.) wishing to develop their professional skills, as well as graduates already working in industry and wanting to add elements to their professional training, for instance in the context of a continuous professional development scheme.

The module draws on the knowledge and expertise of a carefully selected group of lecturers currently working at the leading edge of research and development in Europe and associated to universities and industry:

Dr Murat Peksen	MES Multiphysics Energy Solutions, Jülich, Germany
Dr Alessio Alexiadis	University of Birmingham, UK
Dr James Andrews	University of Birmingham, 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		The Modelling Master Class		tentative programme last changed 26/03/17
		P ... plenary lectures (all students), St ... student presentations, M ... specialised lectures		
Sunday	17/09/2017			
	20:30	welcome 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		
M.01	16:00	Basics of FC Modelling and Mathematical Tools pt. 1		Alessio Alexiadis (U Bham)
	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			
M.02	08:30	Basics of FC Modelling and Mathematical Tools pt. 2		Alessio Alexiadis (U Bham)
	09:45	coffee break		
M.03	10:00	Introduction to MATLAB and other programme language structures		Alessio Alexiadis (U Bham)
	11:15	break		
M.04	11:30	Application of FEM: Thermomechanical Modelling		Murat Peksen (FZJ)
	13:00	lunch		
M.05	16:00	Student exercise / project 1		Alessio Alexiadis (U Bham)
	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	21/09/2016			
P.07	08:30	Mirai product knowledge		Vincent Mattelaer (Toyota Europe)
	09:45	coffee break		
M.06	10:00	From 0d to 3d Modelling - CFD, COMSOL and other tools		Murat Peksen (FZJ)
	11:15	break		
M.07	11:30	Multiphysics Modelling		Murat Peksen (FZJ)
	13:00	lunch		
	15:00	excursion		
	21:00	dinner		
Thursday	22/09/2016			
M.08	08:30	Thermodynamical and Kinetics Modelling		James Andrews (U Bham)
	09:45	coffee break		
M.09	10:00	Using Chemical Process Modelling Tools		James Andrews (U Bham)
	11:15	break		
M.10	11:30	Student exercise / project 2		Murat Peksen (FZJ)
	13:00	lunch		
M.11	16:00	Process Modelling: Pro2, ASPEN et. al. - Exerc ise		James Andrews (U Bham)
	17:00	coffee break		
M.12	17:15	Student exercise / project 3		James Andrews (U Bham)
	18:30	break		
St.03	18:45	Student project time		students
	20:00	dinner		
Friday	23/09/2016			
M.13	08:30	Open Source Modelling Tools		James Andrews (U Bham)
	09:45	coffee break		
M.14	10:00	Student exercise / project 4		Murat Peksen (FZJ)
	11:15	break		
St.04	11:30	Student project time		students
	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	aala dinner		

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

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, 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.