Further Information

Venue
The venue for the course will be Weetwood Hall Conference Centre and Hotel, which offers first-class hotel facilities, a business centre and ample parking facilities. Weetwood Hall Hotel is ideally situated 15 minutes north of the centre of Leeds in wooded grounds at the junction of the Otley Road and the outer ring road. It is just 15 minutes from Leeds Bradford International Airport and a short distance from the A1, M1, M626, M621 and M62 motorways. Further details can be found at www.weetwood.co.uk

Course Fees
The following course fees include the cost of tuition, course materials, lunches and light refreshments for the day(s) of attendance: Full five days £1800. Any one day £450.

Accommodation
Bed and breakfast accommodation is available at the course venue, Weetwood Hall Conference Centre and Hotel. We have negotiated the following special rates per night for our delegates:

- Monday – Thursday evening, bed and breakfast £83
- Friday – Sunday evening, bed and breakfast £87

To take advantage of these special rates please book by contacting the hotel direct on 0113 230 6000 (Stevie Standerline), E: stevie.standerline@weetwood.co.uk

Please quote “University of Leeds CPD Unit” and the course name when contacting Weetwood Hall to book accommodation.

Please note that accommodation bookings must be made two weeks before the course commences at the latest to qualify for the special rates and to guarantee room availability. Any accommodation requests after this date will be subject to availability and rates. A list of alternative hotels is available on request. Delegates are responsible for their own evening meals except on Wednesday 23 May when the course dinner is included.

Course Dinner
The course dinner will be held at a Leeds city centre restaurant and is included in the course fee. This will take place on Wednesday evening and transport from and to the restaurant and is included in the course fee. This will take place on Wednesday evening and transport from and to

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How to Book
Booking for this course should be completed through our secure online store. To complete your booking please follow the instructions below:

Online Booking
1. Log on to our online store at: https://store.leeds.ac.uk
2. Select Conferences and Events in the left-hand navigation bar.
3. Select CPD Faculty of Engineering
4. Select the course or event for which you wish to register and click on “Book”.
5. If you are a new user, please follow the instructions to register. If you already have an account log in as usual.
6. Complete the application process as directed by the booking system.

You will receive an automatic confirmation email within 24 hours of your booking.

For online booking queries and for all other enquiries please contact:

Katie Warner
Conference & Events Coordinator
CPD, Conference & Events Unit
Faculty of Engineering
School of Chemical and Process Engineering
Room 3.11
University of Leeds
LS2 9JT
T: +44 (0) 113 343 8104
E: cpd@engineering.leeds.ac.uk
W: www.engineering.leeds.ac.uk/short-courses

Monday 21 - Friday 25 May 2018

NOx and Particulate Real Drive Emissions (RDE)

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Terms and Conditions for Booking

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The course covers the sources of emissions of CO, HC, NOx and PM in SI and diesel engines and on the design and operation of catalytic and particulate emissions reduction systems for both vehicles. The latest technology for emissions reduction from SI and diesel engines is reviewed and the consequences for NOx, CO, HC and PM emissions of CO2 legislation that is making fuel consumption the primary driver in engine development at present. Engine calibration methodology that can reduce fuel consumption at the expense of NOx and engine out emissions is reviewed, which leads to RDE problems if the aftertreatment system for NOx and PM emissions cannot cope with the more transient demands of RDE in congested traffic with longer cold starts.

Extended Audience

The course is relevant to vehicle manufacturers, engine consultancies and emissions control R&D with an interest in RDE and engine and emissions control technology for Euro 6 and beyond as well as for technology for future CO2 emissions reduction. This course does not cover the specialist area of fuel composition influences on emissions as these are relatively low in modern vehicles. This is a change from our previous courses in this area. The course is also relevant to those who need to understand real world traffic emissions from an air quality viewpoint and to those involved in emissions regulation formulation and enforcement.

Please note, the programme of presentations is very intensive and participants are free to choose the presentations most relevant to them.

Programme

Monday 21 May

Real-world driving for SI and diesel vehicles, fuel economy and emissions

08.00 Registration and coffee

08.30 Introduction to the environmental problems of vehicle emissions including GHGs and real world driving

Professor Gordon Andrews, School of Chemical and Process Engineering, University of Leeds

10.00 Coffee

10.15 Remaining compliant; an insight on changing regulations and the current status of RDE legislation

Piotr Bedziak, BOSMAL Automotive Research and Development Institute Ltd., Poland

11.15 Real world driving in congested traffic: implications for road user quality

Professor Gordon Andrews

12.15 Lunch

13.00 Practically, test success and efficiency challenges of operating a real driving emissions test service

Tom Moues, HORIBA MIRA

14.00 Real world driving emissions with comparison with NEDC and WLTC test cycles for diesel and SI vehicles, including start RDE compliance

Piotr Bedziak, BOSMAL Automotive Research and Development Institute Ltd., Poland

15.30 Coffee

15.45 Efficient powertrain development for real drive emissions

Simon Williams, MAHLE Powertrain Ltd

16.45 Cold start PM and PN emissions from PFI and GDI gasoline vehicles

Professor David Kittelson, University of Minnesota, USA

17.30 End of day one

17.45 Welcome reception

Tuesday 22 May

AM - Mainly HDD and bus real drive emissions

08.15 Registration and coffee

08.30 Engine exhaust particles in the atmosphere. Measurement of HDD vehicle exhausts on the highway using a mobile emissions laboratory

Professor David Kittelson, University of Minnesota, USA

09.30 HDD SCR performance in real world driving: evidence of catalytic de-light during free wheeling

Dr. Hu Li, School of Chemical and Process Engineering, University of Leeds

10.15 Coffee

10.30 Real world NOx emissions from state of the art diesel buses. Recalibration of the bus engine to reduce the RDE emissions to those similar to the legislated test cycle

Professor David Kittelson, University of Minnesota, USA

11.15 Real driving emissions using fast response analysers

Dr. Mark Plechak, Cummins

12.00 Euro 3 diesel car in real world congested traffic: major NOx problem and a significant cause of high road NOx. Evidence of DOC de-light in congested traffic

Professor Gordon Andrews

12.45 Lunch

PM – Fundamentals of diesel and SI engines

13.30 Diesel and SI engine thermal dynamics and turbocharging

Professor Gordon Andrews

14.15 Diesel ignition delay and apparent ignition delay in SI engines

Professor Gordon Andrews

15.00 Tea

15.15 The Nissan MK concept with long ignition delay using EGR

Professor Gordon Andrews

16.00 Diesel and SI engine processes that influence particulate formation

Professor Gordon Andrews

17.00 Factors influencing carbon formation in diesel and SI engines

Professor Gordon Andrews

17.45 End of day two

Wednesday 23 May

Fundamentals of SI and diesel gaseous emissions

08.15 Registration and coffee

08.30 CO and HC emissions from SI and Diesel Engines

Professor Gordon Andrews

10.00 Coffee

10.15 NOx formation and control in SI and diesel engines

Professor Gordon Andrews

11.15 EGR for NOx control in SI and diesel engines

Professor Gordon Andrews

12.30 Lunch

13.15 Ultrafine and nanoparticles in diesel, SI and GDI engines

Professor David Kittelson, University of Minnesota, USA

14.15 The effects of vehicle technology on CO2 emissions across a range of different drive cycles

Ben Leahy, BP Formulated Products Technology

15.30 Tea

15.45 Reduction to emission control by catalysts

Dr Claus Gossmann, Johnson Matthey plc

16.30 Three-way catalyst (TWC) substrate development

Professor Gordon Andrews

17.15 End of day three

19.00 Course dinner

Thursday 24 May

Particulate and NOx after treatment with minimum CO2 penalty

08.15 Registration and coffee

08.30 Three-way catalysts

Dr Claus Gossmann, Johnson Matthey plc

09.30 Diesel oxidation catalysts (DOCs)

Dr Claus Gossmann, Johnson Matthey plc

10.15 Coffee

10.30 Diesel Particulate Filters (DPFs) – overview

Dr Ameya Joshi, Corning Inc

11.30 The regeneration of particulate filter systems

Dr Claus Gossmann, Johnson Matthey plc

12.30 Lunch

13.15 Particulate trap substrates for GDI engines - gas turbine particulate filters (GPF)

Dr Ameya Joshi, Corning Inc

14.15 NOx adsorber catalysts

Dr Claus Gossmann, Johnson Matthey plc

15.00 Tea

15.15 Selective catalytic reduction (SCR)

Dr Claus Gossmann, Johnson Matthey plc

16.15 SCR - SCR - urea mixing and control influence on PM

Professor Gordon Andrews

17.00 Integrated Systems

Dr Claus Gossmann, Johnson Matthey plc

17.30 End of day four

Friday 25 May

Diesel fuel injection and engine design trends for low NOx, PM and CO2 emissions

08.15 Registration and coffee

08.30 Common rail fuel injection systems

Dan Mellers, Delphi

10.00 Coffee

10.15 Turbocharging for Low Emission Heavy Duty Diesels

Vidar Steinsbø, Cummins Turbo Technologies Ltd

11.30 Lube oil review for SI and diesel emissions

Professor Gordon Andrews

12.30 Lunch

13.15 Cold start and implication for real world emissions in urban driving

Professor Gordon Andrews

14.45 Review of RCCI and HCCI

Professor Gordon Andrews

16.00 Tea and end of course

Accreditation

This course is in association with the Institution of Diesel and Gas Turbine Engineers, which is devoted to the advancement of Diesel and Gas Engines, Gas Turbines and related products and technology.

The Energy Institute has approved the University of Leeds – Faculty of Engineering as an Approved Training Provider.

Please note that, although the organisers remain devoted to the programme specified, they reserve the right to vary the programme in detail if required to do so by factors beyond their control.

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