

Continuing Professional Development (CPD) for Teachers/Technicians of Physics

**Practical Work and Laboratory Techniques applicable to
Higher and Advanced Higher Physics, 30th May / 7th June, 2018**

The Physics Department of the University of Aberdeen will host two professional development days for Teachers and Technicians of Physics. The course will be practically based and will provide an opportunity to try experiments suitable for AH investigations, AH course work and Higher Physics. It is hoped that it will include a lecture on at least one of the days covering a relevant topic. More details about the lecture(s) will follow in future mailings.

The programme for both days will have the same format and an outline version is given below. A later version will contain more detail.

If the event is heavily subscribed, it may be necessary to restructure either or both of the days but every attempt will be made to retain all the ingredients.

Aims:-

- To provide ideas for AH investigations using a limited budget
- To introduce some alternative pupil experiments and teacher demonstrations
- To extend teachers' and technicians' practical knowledge and expertise
- To network with other teachers and course providers

Programme: - (The position/time of the lecture, if included, may change.)

| | |
|-------------|---|
| 0900 – 0915 | Registration |
| 0915 – 1030 | Laboratory practical work |
| 1030 – 1100 | Coffee, discussion and display of kits |
| 1100 – 1200 | Continuation of laboratory practical work |
| 1200 – 1300 | Lecture |
| 1300 – 1345 | Lunch and discussion (Networking) |
| 1345 – 1520 | Continuation of laboratory practical work including opportunities to see up to three demonstrations. All three of these are new this year |
| 1530 | Depart |

Laboratory practical work

In previous years it has been the practice to choose an in-depth experiment prior to the event. This year, one of each of the popular in-depth experiments will be available and can be tried in its entirety or in part during any of the laboratory sessions.

Short, Mini experiments and Exhibits will be available in a similar manner to that of 2017. Several short experiment ideas can be brought together to form the basis of an AH investigation. In the short experiments measurements are made and results analysed. In many of the mini experiments setting up procedure and observation is more relevant.

Draft lists of experiments and demonstrations are on the following pages.

List of Popular In-depth Experiments

At least one of each of the following will be available to try at any time on either day.

| Title/Description |
|--|
| Moment of Inertia of a Bicycle Wheel (several methods used) |
| Multiple slit Interference and Diffraction (using an optical laser) |
| Transverse Vibrations of a Wire (3 factors possible – l, T and μ) |
| Induced Voltage (magnet free-falling through coil) |
| LCR Circuits (Phase Relationships, Series Resonance & waveforms) |
| Photoelectricity – LEDs and Planck's Constant |

Some of the above have two versions, one involving the use of a PC and the appropriate software (PASCO or ALBA) to record readings and the other requiring the experimenter to take readings.

List of Shorter Experiments (* these are new this year)

| Topic | Experiments |
|----------------------|--|
| Resistance | <ol style="list-style-type: none"> Variation with length Variation with X section Variation with material Variation with temperature |
| Sound | <ol style="list-style-type: none"> Speed in air Speed in steel Speeds in different metals Transducer characteristics Interferometry |
| Capacitance | <ol style="list-style-type: none"> Variation with area of overlap * Variation with plate separation * Variation with material * |
| E M Waves | <ol style="list-style-type: none"> Speed in air Speed in cable Polarisation Antenna radiation pattern |
| Photoelectricity | <ol style="list-style-type: none"> Photovoltaic mode Photoconductive mode Photometry |
| Reactance | <ol style="list-style-type: none"> Capacitive with frequency Capacitive with capacitance Inductive with frequency Inductive with inductance |
| Optical Polarisation | <ol style="list-style-type: none"> The OP-AMP * Photo-detector * Linearity check * Refractive index of glass at laser wavelength * Transmission axis of Polaroid sheet * Degree of polarisation on transmission axis * |

List of Demonstrations (* these are new this year)

| Topic | Brief description of experiment |
|---------------------------------------|---|
| Photoelectric Effect * | Using a simple vacuum photocell to show the different stopping potential required at different wavelengths of light |
| Interferometer * | Showing the principles of the Michelson Interferometer using a simple low cost ultrasound arrangement |
| Magnetic Induction In Long Solenoid * | Using a linear hall device to plot the field due to a long solenoid. |

Fee:
1 Day:

The course will cost £125.00 per person, this includes lunch and refreshments.

2 Days:

The course will cost £200.00 per person, this includes lunch and refreshments.

Contact: Further information is attached. Should you like further information relating to this programme of events, please contact CPD Services, Research and Innovation, University of Aberdeen, Room 28, University Office, King's College, Aberdeen. Tel: 01224 272523. Fax: 01224 272319.

Email: cpdservices@abdn.ac.uk

Please complete the registration form below on the next page.

REGISTRATION FORM**Deadline for Registration - 30th April 2018****Professional Development for Physics Teachers/Technicians
Wednesday 30th May 2018 & Thursday 7th June 2018**Title: First Name: Surname:

Job Title: _____ Organisation: _____

Address: _____

Country: _____ Postcode: _____

Telephone: _____ Fax: _____

Email address for correspondence:
_____Any special needs – e.g. dietary/mobility/sensory awareness?
_____**Please choose one of the following options which best describes you:***This information will enable us to help shape the course to suit your requirements.*

- I am a teacher of physics with a physics background
- I am a teacher of physics with a different science background
- I am a technician of physics with a physics background
- I am a technician of physics with a different science background

Please choose which day(s) you wish to attend:

- Wednesday 30th May 2018
- Thursday 7th June 2018

Fee:**1 Day:**

The course will cost £125.00 per person, this includes lunch and refreshments.

2 Days:

The course will cost £200.00 per person, this includes lunch and refreshments

Payment DetailsPlease invoice my organisation:

The purchase order number is: _____

VAT no: _____

Please complete and send the registration form to:

Email: cpdservices@abdn.ac.uk

Or fax 01224 272319

Or post: CPD Services, Research and Innovation, Room 28
University Office, University of Aberdeen, King's College, Aberdeen,
AB24 3FX

Joining Instructions (including a map of the University campus) will be emailed out approximately 2 weeks prior to the event to the registered email address given above.

Campus Parking – please note that parking on-campus is on a first come first serve basis in designated areas only displaying a valid parking permit. Alternative means of transport is preferred however if you are to take your car, please contact us in advance for a parking permit and further details.

Terms & Conditions - By registering for this event you agree to the University of Aberdeen's Terms and Conditions for Delegates.

Terms and Conditions for Delegates

The following conditions apply from the date we receive confirmation of a booking from you, for an "event" being hosted by the University of Aberdeen (hereinafter the "University" or "us" or "we"). In these conditions you are the person, firm or company making the booking (hereinafter the "Delegate" or "You").

1. Health & Safety

Delegates will at all times abide by the conditions of the University's health and safety regulations. Whilst attending an event at the University Delegates must comply with reasonable instructions given by the event organisers or other University staff.

2. Data Protection

Information provided by Delegates is confidential and will be held by the University in accordance with the Data Protection Act 1998; it will be used for course administration purposes. The University may send you details of similar courses which we feel may be of interest to you or your colleagues, if you do not want to receive any additional information please sign here: _____

3. Payment

The University will issue an invoice on registration of the Delegate. Such invoice shall be paid within thirty (30) days of receipt. Payment can be made by cash, cheque, banker's draft or a credit card the University accepts. Cheques should be made payable to The University of Aberdeen as specified on the invoice. VAT, where applicable, shall be chargeable at the prevailing rate.

The University reserves the right to charge interest at the rate of 2.5% for each month or part thereof that the invoice remains outstanding. The terms and conditions of the University's credit policy shall apply.

4. Cancellations

In the event of cancellation a refund of the registration fee, less an administrative charge will be made, provided that notice is received in writing no less than 30 days before the event. It is regretted that cancellations received after this time will be liable for the full Delegate fee. Substitute delegates may be made at any time however an administration charge may apply. If the University cancels the event, you will receive a full refund.

5. Delegates Responsibilities

5.1 You shall act in a proper and orderly manner, leave promptly at the appropriate time and comply with all reasonable requests the University staff or the venue's staff may make of You while at the event. If you do not comply with this condition, you will pay the University compensation for any loss that this causes the University, including any legal fees reasonably incurred.

5.2 You promise us you shall not bring any food or drink into the premises where the event is held ("Premises") or consume at the Premises any prize won during the event (unless we specifically allow you, in writing, to do so and we will have no liability whatever in respect of the consumption at the event of any food or drink which we or the venue have not supplied.

5.3 Any property that you bring onto the Premises is brought entirely at your risk and we will not assume custody of any such items. Subject to the Hotels Proprietors Act 1956, the owners of the Premises will not accept any liability for damage or loss to items of property that are left unattended or overnight within the Premises.

6. Force Majeure

The University shall not be liable for performing its obligations under this Contract by circumstances beyond its reasonable control. Such performance shall be suspended, and where the obligations of the University cannot be completed within a reasonable time the event will be cancelled with the repayment of Delegate fees for any uncompleted element of the event program. The University will not be liable for any costs associated with such cancellation other than the fee paid by the Delegate hereunder

7. Accuracy of Information

Whilst the University shall endeavour to ensure the accuracy and relevance of any information or materials provided to Delegates as part of any event, the University shall not be liable for and the Delegate shall be entirely responsible for the use to which it puts such information or materials. No representation or warranty of any kind is made or given by the University as to the suitability of any information or materials for use for any particular purpose.

8. Liability and Indemnity

The University will not accept responsibility for death, injury, disease, theft or damage to property unless the University or its employees are found to be at fault.

9. Law

This Contract shall be governed and construed in accordance with the Law of Scotland. All disputes arising hereunder shall be subject to the exclusive jurisdiction of the Scottish Courts

The University of Aberdeen is a charity registered in Scotland, No: SC013683

