



Dear Head of Physics,

An invitation to the launch of the Physics Dynamic Laboratory Techniques Manual (DLTM)

You, or a representative, are invited to the launch of the DLTM to be held at the University of Bristol in June.

The Physics Dynamic Laboratory Techniques Manual is a resource designed to assist Physics undergraduate students with their practical work during their transition from Post 16 courses to degree courses. This laboratory skills software is designed to sit within a Higher Education Institution's virtual learning environment (VLE) to be accessed by new undergraduates, foundation level students as well as those already further along on Physics courses as part of their pre-lab work. The resource supports general laboratory skills and not specific experiments.

This project is funded by the Higher Education Academy (HEA) and **will be made available freely** to all UK Physics Departments in HEIs. . Details of the overall project can be found at: <http://www.chemlabs.bris.ac.uk/DLTM.html>

The launch will be held at the University of Bristol on Wednesday 12 June 2013 from 2:30 to 4:30 pm.

To book a place for yourself or colleague(s) and to receive more detailed information please email Project Administrator Dr Fai Tila at chem-dltm@bristol.ac.uk.

We look forward to seeing you.

Best wishes,

Professor Dudley E. Shallcross NTF FRMet. Soc FSB MRSSaf FRSC

(Project Grant Holder)

The DLTM Resource

The DLTM is based on the pedagogy of the national award winning Bristol ChemLabS Dynamic Laboratory Manual (DLM). Students who have engaged with these activities should make better use of their laboratory time and reduce their demand on the lab demonstrators to teach the basics, thus allowing demonstrators to demonstrate at a higher level or to assess more effectively.

The topics chosen are independent of specific experiments. The items are there to review, or for some to view for the first time, the techniques that could be used within a specific investigation ahead of a practical session ('pre-labs').

The resource contains:

- support for units of measurement, significant figures, error and uncertainty, graphing data,
- how to use of multimeters, oscilloscopes and signal generators,
- the general science skills involved in measuring volume, time temperature and distance, weighing, heating, cooling, circuits and reading scales.

Each section gives a brief general introduction to the technique with images of equipment commonly used, sectioned video clips with notes giving hints tips and explanations and finally a short multiple choice quiz. The quiz gives feedback to students' answers so can be used formatively or summatively.

It should be noted that for some items of equipment, there are many variations. Not all equipment variations can be shown. The students, having worked through the resource item should be able to apply their knowledge to a slightly different piece of kit as well as to new situations.

The software is supplied as a series of 'SCORM resource items' that are easily uploaded by IT.

Further Information

The laboratory based skills of incoming first year undergraduates in the sciences in the UK HEIs is highly variable; some have had extensive practice in a wide range of practical skills and techniques whilst others have had none at all. Bristol ChemLabS has addressed this issue through the construction of its on-line e-learning tool [1]. The virtual environment for laboratory skills development has allowed undergraduate students to rehearse the practical techniques before entering the laboratories from the comfort of their own homes. This has been shown to have a marked impact on confidence in the laboratory and in practical skill development [2-5].

The DLTM is based on the Dynamic Laboratory Manual (DLM) devised by Bristol ChemLabS, University of Bristol and the Chemistry LabSkills Software used by schools and universities globally. For both Bristol ChemLabS won the Times Higher Education National award in the 'Outstanding ICT Initiative of the Year' category in 2010 [2-5].

The DLTM resource has been built in partnership with Learning Science Ltd [6] the educational software company originally employed by the University of Bristol for its DLMs and an international advisory board, consisting of UK and international academics and UK secondary school teachers.

Project Funding

In 2010 the [Higher Education Academy National Teaching Fellowship Scheme](#) awarded a three year grant to Professor Dudley Shallcross to develop Dynamic Laboratory Techniques Manuals for Physics and Physics. As part of this project the DLTM resources will be presented to any UK-based Higher Education Institution that wishes to make use of them.

Main Authors

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References

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- [2] T.G. Harrison and D.E. Shallcross (2008). 'A Chemistry Dynamic Laboratory Manual for Schools', *Chemistry in Action*, **86**, Winter p20-22 (2008).
- [3] Harrison T.G., Shallcross D.E., Heslop W.J., Eastman J.R. & Baldwin A.J. (2009), 'The LabSkills Dynamic Lab Manual - an e-learning initiative to enhance schools' and colleges' laboratory practical work for students, trainee teachers and technical staff', *Acta Didactica Napocensia*, 2, 1, 1-8. Also available at http://adn.teaching.ro/article_2_1_1.pdf (last accessed January 2013).
- [4] Harrison T., Norman N.C. and Wyatt P. (2011). 'The Dynamic Laboratory Manual: E-Learning Software to Support Practical Chemistry Skills Development', *Chemical Education Newsletter*, American Chemical Society. CHED Committee on Computers.
- [5] Harrison T.G., Heslop W.J., Eastman J.R., Baldwin A.J. and Shallcross D.E. (2012). *Chemistry LabSkills: Software to Support Laboratory Skills from Schools' Pre-University to University Foundation Courses*, *Australian Journal of Education in Chemistry* (in Press).
- [6] <http://www.learnsci.co.uk/>, last accessed October 2012.