

# ViridiSkills

## Continuing Professional Development Courses

A series of one day courses in analytical chemistry, radioanalysis and quality

Professional courses, expert tutors offering a flexible approach to your continued professional development.

Attendance on these courses will help you meet the requirements of ISO 17025 to maintain and demonstrate competency in technical areas and provide confidence in the quality of your analyses

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**Programme of one-day courses**

<b>Course title</b>	<b>Content</b>	<b>Trainer</b>
<b>Introduction to radioactivity</b>	The atom, the nucleus & its components, isotopes, beta decay including positron emission and electron capture, conversion of mass to energy, alpha decay, gamma ray emission nuclear stability, units of radioactivity, cosmogenic radionuclides	Desmond MacMahon
<b>Nuclear reactions</b>	Neutron induced reactions, radiocarbon dating, (n, $\alpha$ ) reactions, nuclear fission, neutron activation, other nuclear reactions	Desmond MacMahon
<b>Radioactivity in the environment</b>	Origins of radioactivity in the environment, artificial radionuclides, activation products & fission products, legislation, modelling, habit data, monitoring, monitoring design, RIFE, incidents, NAIR, RIMNET	George Ham
<b>Sampling, subsampling &amp; storage for radioactivity</b>	Planning for sampling, representative sampling, heterogeneity & uncertainty, bulking & subsampling, collection, sample handling & storage, traceability, chain of custody, health & safety	George Ham
<b>Sample preparation for radioanalysis</b>	Preparation of different matrices, drying & ashing, grinding material & sieving for representative samples, subsampling & bulking prior to analysis, Ion exchange, solvent extraction & precipitation, use of radiotracers, electro-deposition & other methods of preparing sources for counting	George Ham
<b>Alpha spectrometry</b>	Introduction to alpha spectrometry, components and detectors, energy calibration, detector efficiency, spectrometry software, interferences, peak evaluation, background corrections, estimation of uncertainty, sample preparation	George Ham
<b>Radiation detection &amp; measurement</b>	Interactions of radiation with matter, gamma rays, charged particles: alpha & beta particles, detection & measurement of radiation: gamma ray spectrometry, gas counters, neutron detectors	Desmond MacMahon
<b>Gamma-ray spectrometry</b>	Semiconductor detectors, energy calibration, detector efficiency, spectrometry software, Interferences, peak evaluation, background corrections, sample preparation, sample geometry, peak identification	Susan Parry
<b>Liquid scintillation counting</b>	The theory of liquid scintillation counting, instrumentation used in liquid scintillation counting, the role of scintillants, preparation of samples, source preparation, calibration of the instrument, quantitative analysis with liquid scintillation counting	Peter Warwick
<b>Introduction to inductively coupled plasma - atomic emission spectrometry</b>	Performance characteristics, applications, instrumentation, introduction to sample preparation, quantifying measurements, background correction	John Williams
<b>Introduction to inductively coupled plasma - mass spectrometry</b>	Performance characteristics, instrumentation, mass analysers, ion extraction, detectors, vacuum systems, interference and matrix effects, introduction to sample preparation, quantifying measurements, applications.	Kym Jarvis
<b>Analysis of waters &amp; environmental samples by ICP-MS</b>	Sample preparation, ashing, digests, saline and fresh water, interferences, dissolved solids, application of collision and reaction cell	Kym Jarvis
<b>Analytical science</b>	Sampling, calibration of equipment, chemicals, qualitative and quantitative analysis, determining the sources of error, random errors, systematic errors, accuracy, precision, bias, uncertainty, recovery, certified standards, reference materials,	John Williams
<b>Valid analytical measurement</b>	Quality assurance, quality control, method validation, sample preparation, equipment, recovery, uncertainty, precision, linearity, range of use, robustness, uncertainty, control charts, proficiency testing	Susan Parry
<b>Introduction to technical requirements of ISO 17025</b>	Universal principles, personnel, accommodation & environmental conditions, test and calibration methods, equipment, measurement traceability, sampling, handling of test items, quality control, reporting results	Kym Jarvis

## The Training Team



### **George Ham**

George has 40 years experience in environmental radiochemistry, at the CRCE labs in Chilton. Until recently he was the chairman of the UK Analysts Informal Working Group. He is a technical assessor in environmental radiochemistry for ISO17025



### **Kym Jarvis**

Kym is an acknowledged international expert in the application of inductively coupled plasma techniques and a technical assessor in inorganic chemistry for ISO17025. She is a Director of Viridian Consultants and visiting Professor at Imperial College, London.



### **Desmond MacMahon**

Desmond has over 40 years teaching and research experience in the fields of reactor physics and radionuclide metrology at the Scottish Universities' Reactor Centre, the National Research Council of Canada, Imperial College London, the Ministry of Defence and the National Physical Laboratory. He has taught on IAEA short courses in Italy & EU courses in Bulgaria



### **Susan Parry**

Susan is recognised internationally as an authority on radioanalytical chemistry with a long academic career in radiochemistry at Imperial College as well as twenty years managing an analytical facility offering specialist commercial services to industry. She is a Director of Viridian Consultants & technical assessor for ISO17025 in radiochemistry



### **Joe Toole**

Joe has 35 years' experience working in the nuclear and environmental analytical sector. Previously at the Scottish Universities Research and Reactor Centre, Analytical Sciences Centre, Harwell and at Dounreay Sites Restoration Ltd. He is presently Managing Director at EnviroRAD Ltd providing consultancy & training on NORM waste management & is Technical Assessor for ISO17025 & for other European Accreditation bodies



### **Peter Warwick**

Peter retired from his posts of Head of the Department of Chemistry and Director of the Centre for Environmental Studies at Loughborough University in 2010. Professor Warwick has an international reputation for research and teaching in radiochemistry and was awarded the Becquerel Medal for his outstanding contributions to radiochemistry



### **John Williams**

John has over 25 years of ICP-MS experience, both in academic research and in commercial development. He has supervised numerous analytical projects and spent 10 years as a director of a scientific instrument company. He is a Director of Viridian Consultants

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