

[www.winss.org](http://www.winss.org)

# Free Training Courses on Scientific Skills

## Accredited Modules

### 2013-2014



**School of Chemistry**



**Pharmaceutical and Molecular Biotechnology Research Centre**



Waterford Institute of Technology  
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

*The Wales Ireland Network for Scientific Skills (WINSS) project has been part-funded by the European Regional Development Fund through the Ireland Wales 2007-13 INTERREG IVA Programme*



Ireland's EU Structural Funds  
Programmes 2007 - 2013  
Co-funded by the Irish Government  
and the European Union



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**1. Introduction:**

The School of Chemistry at Bangor University (BU) and the Pharmaceutical and Molecular Biotechnology Research Centre (PMBRC) at Waterford Institute of Technology (WIT) have been awarded funding from the European Regional Development Fund (ERDF) through the Ireland/Wales Interreg programme which supports us to work on the “Wales Ireland Network for Scientific Skills” (WINSS) project.

The WINSS initiative is made up of three integral components (Figure 1):

- An Advanced Training Programme combining industry experience and academic expertise to design and deliver scientific training courses
- An Innovative Research Programme aimed to enhance scientific skills through laboratory based research
- Transfer of Knowledge between industry and academia facilitated by dissemination workshops in Ireland and Wales



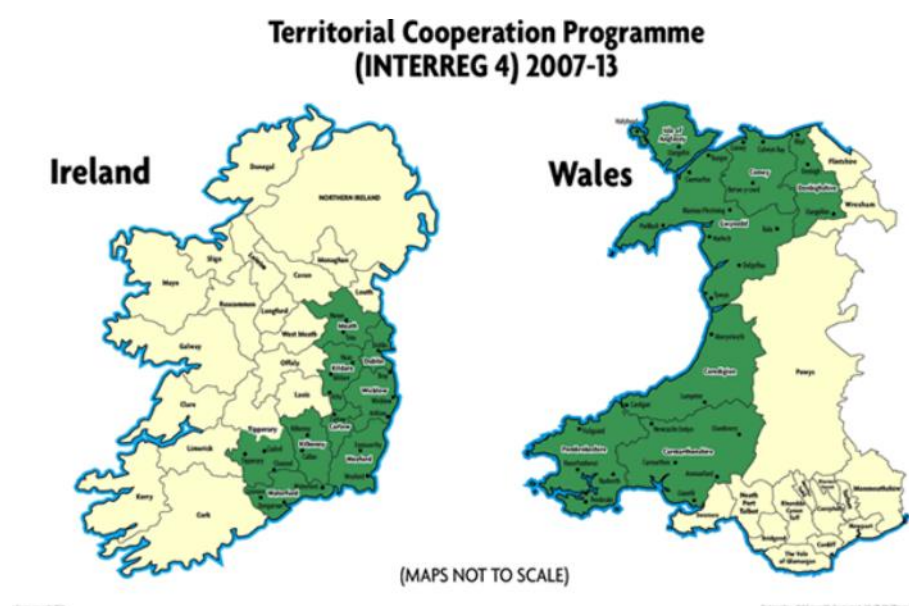
**Figure 1:** Three integral components of WINSS initiatives

Four Development Scientists from WIT and BU respectively are receiving advanced project-based trainings by working on industrial linked research projects. WINSS also runs hands-on skills training workshops (Figure 2) and organizes scientific seminars. BU organizes 12 public Scientific Seminars co-funded by RSC and ERDF through WINSS per year. (Details can be found at <http://www.bangor.ac.uk/chemistry> and [www.winss.org](http://www.winss.org))



**Figure 2:** WINSS team, pictured at the Scientific Skills Workshop and Network Event held at Bangor University in September 2012

A Skill Needs Survey covering the cross border region (green patches in Figure 3) has been conducted by the WIT (Ireland) and BU (Wales). This information allowed the WINSS team to tailor and design new skills training courses and accredited modules to meet the needs of local SMEs and individuals. These accredited scientific skills training courses (see section 2 and Table 1) will be most valuable for companies working across chemistry, life sciences and material sciences sectors. These accredited training courses will be an outstanding opportunity for eligible SMEs and individuals across the border region of Ireland and Wales to receive fee-free trainings.



**Figure 3:** Areas covered by Territorial Cooperation Programme (Interreg 4) 2007-2013 are coloured in green. Some adjacent areas, such as Flintshire, Wrexham and Swansea are also covered by this program.

## 2. Accredited training modules offered under WINSS:

### Modules Accredited by WIT (Ireland) for WINSS project:

- Advanced Materials Characterisation (10 credits): Level 7- postgraduate
- Advanced Chromatography and Mass Spectroscopy (10 credits): Level 7- postgraduate

- Advanced Spectroscopy Techniques (10 credits): Level 7- postgraduate

The information about these modules is provided by the Irish Partner WIT in a separate leaflet.

**Modules Accredited by BU (Wales) for WINSS project:**

- FXW1001: Chemistry in Everyday Life (5 credits): Level 4-entry, undergraduate
- FXW1002: Analytical Techniques (5 credits): Level 4-entry, undergraduate
- FXW4001: Glycobiology for Pharma Apps (5 credits): Level 7- postgraduate
- FXW4001: Polymeric Biomaterials (5 credits): Level 7- postgraduate

The information about these modules can be found in section 7 (module descriptions) of this leaflet or online from WINSS website (<http://www.bangor.ac.uk/chemistry/research/winss.php>).

The School of Chemistry at Bangor University also offers a wide range of accredited undergraduate and postgraduate modules. Several modules have been identified through the Skill Needs Survey to meet directly the training needs of SMEs. Therefore, they will be offered to eligible individuals and SMEs as fee-free modules under the WINSS project. These modules are:

- FXX3503: Research Skills
- FXX4999: Laboratory Health and Safety
- FXX4519: Modern Analytical Techniques

The information about these modules can be found in Appendix I of this leaflet or on-line from BU University website (<http://www.bangor.ac.uk/chemistry>).

**A General Transferable Skill** module will also be offered in June or July of 2014 and the course detail will be published in spring 2014.

If you have a training need that has not been covered by this program, please contact us to discuss or complete the Skill Needs Survey form which can be downloaded from our website (<http://www.bangor.ac.uk/chemistry/research/winss.php>). It can also be found in Appendix III of this leaflet.

### **3. Who are these courses designed for?**

These accredited modules are suitable for SMEs and individuals who work or wish to work in the sectors across chemistry, life sciences and material sciences. The training is offered at different levels. Level 4 is an entry level, aimed at learners who require an introductory level of training and are new to a particular topic of study. Level 6 is the final year at undergraduate level and Level 7 is a postgraduate level, aimed at learners who wish to acquire a greater depth of knowledge in the subject or receive a detailed introduction to a new subject.

### **4. How and when will the training be delivered?**

The modules will be delivered either as two- or three-day intensive training courses or several short learning units distributed over one semester at Bangor University. An overview of these accredited modules can be found in table 1, and the detailed module descriptions can be found in section 7. Please contact us if you have specific requirements for the training dates and locations.

Table 1: Accredited Scientific Training Courses offered at BU under WINSS

Module Code	Module Title	Level <sup>a</sup>	Credits	Contact hours (hr)	Private studies (hr)	Assessment methods	Module Organiser	Dates of Courses	Deadline for Registration
FXW1001 <sup>b</sup>	Chemistry in Everyday Life	4	5	12	38	45 minute 'unseen' open-book examination	Dr H Tai	9 <sup>th</sup> -11 <sup>th</sup> Sep 2013	15 <sup>th</sup> Aug 2013
FXW1002 <sup>b</sup>	Analytical Techniques	4	5	12	38	2 written laboratory reports	Dr L Murphy	11 <sup>th</sup> -13 <sup>th</sup> Sep 2013	15 <sup>th</sup> Aug 2013
FXW4001	Glycobiology for Pharma Apps	7	5	12	38	45 minute 'unseen' examination	Dr M Lahmann	30 <sup>th</sup> Oct, 6 <sup>th</sup> , 13 <sup>th</sup> , 20 <sup>th</sup> Nov 2013	15 <sup>th</sup> Aug 2013
FXW4002 <sup>c</sup>	Polymeric Biomaterials	7	5	12	38	45 minutes 'unseen' examination	Dr H Tai	10 <sup>th</sup> -12 <sup>th</sup> Feb 2014	9 <sup>th</sup> Dec 2013
FXX3503 <sup>d</sup>	Research Skills	6	10	27	73	Coursework	Dr L Murphy	Oct-Dec 2013	15 <sup>st</sup> Aug 2013
FXX4999 <sup>d</sup>	Laboratory Health and Safety	7	10	24	76	Continuous Open book assessment	Dr P J Holliman	Oct-Dec 2013	15 <sup>st</sup> Aug 2013
FXX4519 <sup>d</sup>	Modern Analytical Techniques	7	10	62	38	Coursework	Dr L Murphy	Oct-Dec 2013	15 <sup>st</sup> Aug 2013
FXW4003 <sup>e</sup>	Transferable Skills for Succeeding in your career in Chemical and Pharmaceutical Industry	7	5	12 (Two days)	38	Coursework	Dr H Tai	In June or July, 2014 (TBA)	TBA

<sup>a</sup> Level 4 is the entry level, aimed at learners who require an introductory level of training and are new to a particular topic of study. Level 6 is the final year at undergraduate level and level 7 is a postgraduate level aimed at learners who wish to acquire a greater depth of knowledge in the subject or receive a detailed introduction to a new subject.

<sup>b</sup> These two modules are delivered in two and half days, they are not overlapping. Therefore, you can choose both modules.

<sup>c</sup> This module will be delivered in Feb 2014, therefore, there is a late registration deadline. You are however strongly encouraged to apply as early as possible as there are limited places available for each module. If the module is oversubscribed, you will be put on the waiting list and be invited to attend the course next year.

<sup>d</sup> The timetable for these modules will be available in early September 2013 and the teaching hours will be spread over 12 weeks from Oct to Dec 2013.

<sup>e</sup> This module is currently under development, the information about this course will be released in due course. You are however encouraged to express your interest in this module when you complete the application form.



## 5. How to apply and register for a module:

These modules are fully accredited through Bangor University or WIT, allowing the learners to gain recognised credits towards formal qualifications. You will be required to register as a student at either BU or WIT for the study of a BU or WIT non-graduating programme/modules; in this case, it is the WINSS training programme/modules. Upon successful completion of a BU module, learners will be awarded the credits which will be recorded at Bangor University and the learner will receive a credit transcript. For WIT modules, the learner will register as a student at WIT, and WIT will award the credits and keep the records for its own modules.

In order to apply and register for a module under the WINSS training programme, please complete the application form in this leaflet (Appendix II) and post/email it to the following address or complete the application form on-line (<https://adobeformscentral.com/?f=T9xU3yPQRQjc8zXudQFrog>).

Dr Hongyun Tai (WINSS)  
School of Chemistry  
Bangor University  
Deiniol Road  
Bangor, LL57 2UW, UK  
Email: [winss@bangor.ac.uk](mailto:winss@bangor.ac.uk)

As there are limited places for each training module, they will be offered to the applicants on a first-come first-served basis. We strongly encourage you to submit your application form as early as possible. We will confirm your place after receiving your form. You will be sent the further details about the course and the location of the lecture rooms two weeks before the starting date of the course. You will also be advised on how to enrol as a student at Bangor University with no fee required so that you can receive the credits after you successfully complete the module(s).

## 6. Eligibility for fee-free training courses under WINSS

The WINSS project is partially funded by the European Regional Development Fund (ERDF). Under this funding, some companies and individuals may be eligible for fee-free trainings. If you or your business can answer 'yes' to the following key requirements, then you are eligible for fee-free trainings under WINSS. If you cannot answer 'Yes' to the following questions, you are not eligible for fee-free trainings, however you are also welcome to enrol for one or more of our modules (fees for the standard modular rates apply, please find the fee information from <http://www.bangor.ac.uk/ar/main/fees/includes/euhome1314.pdf>)

- For Individuals:

Do you live or have a permanent place of work within the cross border region of Wales and Ireland (Figure 3, areas shaded in green) or adjacent areas such as Flintshire, Wrexham and Swansea?

- For Companies:

Is your company located within the cross border region of Wales and Ireland (Figure 3, areas shaded in green) or adjacent areas such as Flintshire, Wrexham and Swansea? Is your company classed as an SME?

(If you can answer 'Yes' to all four of the following questions, your organisation qualifies as an SME under the EU definition.

- Is the organisation an enterprise, i.e. engaged in economic activity?
- Does it have fewer than 250 employees?
- Does it have an annual turnover not exceeding €50 million? Or does it have a balance sheet total not exceeding €43 million?
- Is it autonomous? )

## 7. Descriptions for newly accredited WINSS modules:

**Module code:** FXW1001  
**Module Title:** Chemistry in Everyday Life



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**Level:** 4, undergraduate

**Credit:** 5

**Module organiser and contact person:** Dr H Tai (Email: h.tai@bangor.ac.uk)

**Lecturers:** Dr H Tai, Dr M Lahmann, Dr L Murphy, Prof Mark Baird

**Time requirements:** 12 hours for formal contact, 38 hours for private studies

**Pre-requisites:** A level Science is preferred, but GCSE Science and relevant life/work experience are acceptable

### Module Overview

**Aims:** This module aims to provide students with tools and chemistry knowledge to link fundamental chemical principles with everyday observations and understand the chemistry in everyday life. These include healthy living, vision chemistry, chemistry in the garden/kitchen and technical equipment such as mobile phones.

**Contents:** Topics covered will include an introduction to biomacromolecules (eg proteins, carbohydrates and nucleic acids), functional group chemistry of natural products, as well as bioluminescence. A special emphasis will be placed on examples of chemistry relating to everyday life, such as chemistry in the kitchen and garden, vision chemistry, and chemistry in modern electronic tools (mobile phone, TV screens, etc.)

### By the end of this module, learners should be able to:

1. Understand how light interacts with organic molecules and how we see colours.
2. Understand chemicals and simple chemical reactions involved in everyday life, such as chemistry in the kitchen/garden and chemistry related to healthy living.
3. Demonstrate an understanding of the major classes of biomacromolecules, including where they are commonly found in nature, their general chemical properties and their constituent chemical building blocks. To demonstrate an appreciation of the medicinal importance of the interactions of biomacromolecules, natural products, cofactors, vitamins and trace elements

### Assessment methods:

45 minute 'unseen' open-book examination with a weighting of 100 %.

**Dates of the course:** 9<sup>th</sup>-11<sup>th</sup> Sep 2013 (2.5 days); **Deadline for registrations:** 15<sup>th</sup> Aug 2013



**Module code:** FXW1002  
**Module Title:** Analytical Techniques



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**Level:** 4, undergraduate

**Credit:** 5

**Module organiser and contact person:** Dr L Murphy (Email: l.murphy@bangor.ac.uk)

**Lecturers and Demonstrators:** Dr L Murphy, Dr M Lahmann, Dr H Tai, Prof Mark Baird, Dr A El-Betany, Dr F Oulaidi, Dr A Jones, Miss A Tochwin.

**Time requirements:** 12 hours for formal contact, 38 hours for private studies

**Pre-requisites:** A level Chemistry is preferred, but GCSE chemistry and relevant life/work experience are acceptable.

### Module Overview

**Aims:** The module will give an introduction to instrumental methods used in the analysis of substances and materials of relevance to the companies in the chemistry-related industry. The course is structured to provide a basic introduction to instrumentation, analysis and interpretation of analytical data. This is achieved via 'key concepts' lectures which lead into related laboratory sessions. The aim will be to provide the student with the ability to carry out basic analysis of spectra from a range of modern techniques that might be met in an industrial laboratory.

**Contents:** The course will introduce the basic principles, key theoretical and practical aspects of techniques, such as UV/Vis, Thin Layer Chromatography, Gas Chromatography, High Performance Liquid Chromatography, Quantification of metals and non-metals, X-ray and electron diffraction, Infrared, Mass spectrometry, and Nuclear magnetic resonance. The course will also provide practical experience in the use of these analytical methods.

### By the end of this module, learners should be able to:

1. Describe the basic principles of each instrumental method listed in the course description.
2. Perform simple analytical experiments, utilising two of the instrumental methods listed in the course description, to separate and/or characterise compounds and materials.
3. Interpret analytical data generated from the instrumental methods listed in the course description.
4. Select which instrumental method or methods may be most appropriate to separate and/or characterise compounds and materials arising from a range of science disciplines.
5. Write up laboratory reports.

### Assessment methods:

Summative assessments are 2 written laboratory reports (50 % each) (Learning Outcomes 1-5), formative feedback will be given verbally within laboratory sessions as well as from written comments on laboratory reports (Learning Outcomes 1-5).

**Dates of the course:** 11<sup>th</sup>-13<sup>th</sup> Sep 2013 (2.5 days); **Deadline for registrations:** 15<sup>th</sup> Aug 2013





**Module code:** FXW4001  
**Module Title:** Glycobiology for Pharma Apps



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**Level:** 7, postgraduate

**Credit:** 5

**Module organiser and contact person:** Dr M Lahmann (Email: m.lahmann@bangor.ac.uk)

**Lecturer:** Dr M Lahmann

**Time requirements:** 12 hours for formal contact, 38 hours for private studies

**Pre-requisites:** BSc degree in any related sciences.

### Module Overview

**Aims:** Carbohydrates in biological systems for pharmaceutical applications will be the focus of this module, aiming to advance students' knowledge of biological chemistry, highlighting the cross-disciplinary nature of this area. A particular emphasis will be on the understanding of the role of biologically active compounds (e.g. enzymes and proteins, lectins, carbohydrates, and other biopolymers) in biological systems at a molecular level, and how to study and analyse such systems. Examples will be given to illustrate links to health and disease.

**Contents:** Glycobiology – This module will introduce the role of carbohydrates in biological systems. Starting from basic concepts and terminology specific to carbohydrate chemistry, the following areas will be covered: properties and structures of common polysaccharides (e.g. amylose, cellulose, chitin, chitosan, peptidoglycans, pectins, dextrans, glycosaminoglycans, proteoglycans), chemical and enzymatic synthesis and degradation, complex carbohydrates (case studies: human and bacterial structures), glycoconjugates (case studies: glycoproteins, glycolipids), carbohydrates in medicine (case studies: lead structure, vaccine, inhibitors), carbohydrate recognition (case studies: lectins) in e.g. inflammatory processes (immune system), protein folding, blood group typing.

### By the end of this module, learners should be able to:

1. Conversantly apply carbohydrate chemistry terminology.
2. Recognise/draw and critically discuss the chemical structure/properties of common polysaccharides.
3. Evaluate general principles of carbohydrate recognition and its role in biological systems (e.g. cell-cell communication).
4. Critically discuss the role of carbohydrate recognition processes in the context of hygiene, prophylaxis, health and disease.

### Assessment methods:

Summative assessment is obtained through one 45 minute 'unseen' examination (outcomes 1-4) with a weighting of 100 %.

**Dates of the course:** 4-7 pm, Weds, 30<sup>th</sup> Oct, 6<sup>th</sup>, 13<sup>th</sup> and 20<sup>th</sup> Nov 2013; **Deadline for registrations:** 15<sup>th</sup> Aug 2013



**Module code:** FXW4002  
**Module Title:** Polymeric Biomaterials



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**Level:** 7-postgraduate

**Credit:** 5

**Module organiser and contact person:** Dr H Tai (Email: h.tai@bangor.ac.uk)

**Lecturer:** Dr H Tai

**Time requirements:** 12 hours for formal contact, 38 hours for private studies

**Pre-requisites:** BSc in a Chemistry-related science subject is preferred. But BSc in any other Science subject will be acceptable.

### Module Overview

**Aims:** The major aim of this module is to advance students' knowledge of polymeric biomaterials, highlighting the cross-disciplinary nature of this research area. The lectures will give an overview of the state of art research and developments on biomacromolecules in relation to their synthesis, physical and biological properties and applications in tissue engineering and drug delivery. The biomacromolecules covered in this module will include biodegradable polymers, responsive polymers and bioconjugates. A particular emphasis will be on the understanding of the important role of polymeric biomaterials in drug delivery and tissue engineering and the design and synthesis of such materials.

**Contents:** This course will cover aspects on the structures, synthesis and biosynthesis, properties and applications of major classes of polymeric biomaterials, such as synthetic biodegradable polymers, responsive polymers, bioconjugates, and naturally occurring biopolymers (e.g. DNA, RNA and proteins). The preparation and functionalization of polymeric biomaterials will be described, including free radical mechanisms, living/controlled free radical polymerisations, ring opening polymerisation, polycondensations and click chemistry.

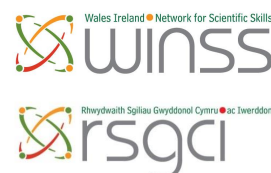
### By the end of this module, learners should be able to:

1. Design the macromolecules with rational structures aiming for desired properties in biological and biomedical applications.
2. Identify and critically evaluate the relationship of structures of biomacromolecules and their physical and biological properties.
3. Predict the properties of biomacromolecules according to their chemical structures.
4. Illustrate the mechanisms for synthetic and biosynthetic schemes of biopolymers.

### Assessment methods:

Summative assessment is obtained through one 45 minute 'unseen' examination (outcomes 1-4) with a weighting of 100 %.

**Dates of the course:** 10<sup>th</sup>-12<sup>th</sup> Feb 2014; **Deadline for registrations:** 9<sup>th</sup> Dec 2013



## Appendix I: Module descriptions for the existing modules

The following accredited modules from the undergraduate courses at the School of Chemistry, Bangor University will be offered to eligible individuals and SMEs under WINSS. You are required to meet the minimum knowledge requirements (pre-requisites) to register for these modules. They are delivered in the first semester of the academic year. The module descriptions in this appendix are extracted from the Student Handbook, the latest version can be found on-line from the University website.

<b>Module No.:</b>	<b>FXX3503/FXC3503</b>	1 <sup>st</sup> Semester
<b>Title:</b>	<b>RESEARCH SKILLS</b>	
<b>Organiser:</b>	Dr L M Murphy	
<b>Lecturers:</b>	Dr L M Murphy, Dr H Tai, Dr M Lahmann, Dr R A Davies, Dr M A Beckett, Dr K Hughes,	
<b>Pre-requisites</b>	A level chemistry and relevant working experience, or the chemistry knowledge at the second year undergraduate level, or a BSc degree in any Science subject.	
		<b>Level: 6   Credit Value: 10</b>

### Description

The module aims to provide students with the opportunity to develop and practice skills that underpin chemistry research methodology. The students will be able to reflect upon the nature of the scientific method. The students will be able practice researching and preparing a short literature review on an advanced chemical topic. They will also develop their project management skills and use these to plan and monitor activities they will undertake as part of their 3<sup>rd</sup> year undergraduate project modules. They will develop an awareness of current chemical research via précising School/RSC research colloquia.

### Aims

The main aims are that students will be able to:

1. Identifying and retrieve chemical research information (from peer reviewed journals and academic databases)
2. Organise, summarise and integrate the chemical literature
3. Understanding of science ethics, public understanding of science
4. Perform project management- focusing on project planning and monitoring.
5. The nature of the scientific method.
6. Have an awareness of current chemistry research (RSC lectures)

### Learning Outcomes

At the end of the module you should be able to demonstrate:

1. Prepare a project planning portfolio for a project, such as 3<sup>rd</sup> year project (Hypotheses, Gantt Chart, Resource plan and project poster)
2. Identify and organise a list of 5-10 research papers relevant to this project.
3. Summarise advanced chemistry research as presented within School/RSC colloquia
4. Discuss the nature of the scientific method
5. The ability to promote and disseminate an understanding of chemistry to the wider community.

### Teaching and Learning Strategy

The module has seven, three-hour workshops and 6 one-hour (RSC/School of Chemistry Colloquia) lectures schedules during weeks 1 - 12. Contact time 27 hours, private study 73 hours.

### Assessment Methods

1. **Coursework (60%)** - Project Planning Portfolio. (Gantt Chart (10%), Area of Study (35%), and project poster (15%). (learning outcome 1)
2. **Coursework (15%)** - Prepare a Reference Library and rationale for inclusion of papers therein. The student

will be able to identify and briefly justify the usefulness of each reference (10%) and organise, via appropriate reference managing software, (5%) a list of 5-10 research papers relevant to the project. (Learning outcomes 1 - 2).

3. **Coursework (10%)** - Submit two précis of RSC/School of Chemistry Lectures. Summarise advanced chemistry research as presented within School/RSC colloquia. (Learning outcome 3)
4. **Coursework (15%)** - Public Understanding of Science: Group work to promote and disseminate an understanding of chemistry to the wider community. (Learning outcome 4 and 5).

<b>Module No.:</b>	<b>FXX4999</b>	1 <sup>st</sup> Semester
<b>Title:</b>	<b>LABORATORY HEALTH AND SAFETY</b>	
<b>Organiser:</b>	Dr P J Holliman	
<b>Lecturers:</b>	The Red Cross, The Fire Service, Dr P J Holliman	
<b>Pre-requisites</b>	BSc in a Chemistry-related science subject is preferred. But BSc in any other Science subject will be acceptable. Relevant working experience will be considered.	
		<b>Level: 7 Credit Value: 10</b>

### Description

This course gives a basic grounding in safety training. A series of videos/lectures are used to give the students awareness of all safety issues which include legal requirements, filling in COSHH assessment forms, use of data bases etc. The students also participate in an intensive first aid course under the guidance of the Red Cross, the successful completion of which results in certification. Also included is a practical fire fighting course where the students learn the basis of fire prevention, the correct techniques in the use of and choices of fire extinguishers. Finally the students are expected to put together a small portfolio to indicate that they have put the knowledge into practice in their course - e.g. demonstrate the proper use of COSHH assessments etc. This will be backed up by their supervisor's/line manager's input.

### Aims

1. To provide a basic safety grounding.
2. To produce students with first aid knowledge.
3. To teach fire fighting (basic) strategies and give an understanding of the nature and types of fires.
4. To put into practice the safety skills learned throughout the rest of the year in all other courses.

### Learning Outcomes

1. The students will obtain knowledge of practical and current first aid skills.
2. They will be able to correctly assess an accident situation and act appropriately.
3. The students will be able to use fire extinguishers correctly and they will be able to critically judge the correct extinguisher.
4. The students will have the ability to fill in risk assessment forms and will have a basic knowledge of legal responsibilities.

### Teaching and Learning Strategy

After general introduction in semester one the module has a half day First Aid course (run by the Red Cross), a half day of seminars including safety briefings and videos and a two hour Practical Fire Training session (run by the Fire Brigade).

### Assessment methods

This is a pass/fail core module which is continuously assessed. All three components and learning outcomes must be achieved to pass the module.

1. First Aid Certification awarded on successful completion. (Learning outcome 1)
2. Fire Service Certificate awarded on successful completion. (Learning outcome 2)
3. Open book assessment based on taught lecture material. Certificate awarded. (Learning outcome 3)
4. Approval of Portfolio of proof of skills demonstration. (Supervisor checked) (Learning outcome 4)

Module No.:	<b>FXX4519</b>	1st Semester
<b>Title:</b>	<b>MODERN ANALYTICAL TECHNIQUES</b>	
<b>Organiser:</b>	Dr L Murphy	
<b>Pre-requisites</b>	BSc in a Chemistry-related science subject is preferred. But BSc in any other Science subject will be acceptable. Relevant working experience will be considered.	
<b>Level: 7   Credit Value: 10</b>		

**Description**

The course contains three analytical chemistry practicals (UV/Vis, atomic absorption, advanced chromatography). Valid analytical measurement and computer statistics packages are also covered in the context of experimental data analysis.

**Aims**

1. To give student experience of modern trace chemical analysis
2. To give student experience of Valid Analytical Measurement in an industrial context
3. To give student experience of statistical software packages

**Learning Outcomes**

1. To be able to use selected advanced analytical practical techniques.
2. To have a working knowledge of VAM in an industrial context.
3. To have knowledge of operation of selected advanced statistical software packages.

**Teaching and Learning Strategy**

The module has three analytical chemistry practicals (1 per week for 3 weeks), VAM lectures, and statistics practicals (computer based learning). Contact time 62 hours; private study 38 hours.

**Assessment methods**

Assessment for the module is obtained through, reports for analytical techniques; coursework for statistical practicals (100%) (Learning outcomes 1- 3) and attendance of Valid Analytical Methods course (formative on attendance).



## Appendix II:



## WINSS Training Courses Application Form

Please complete this application form and return it to the following address or email it to [winss@bangor.ac.uk](mailto:winss@bangor.ac.uk) before the 15<sup>th</sup> Aug 2013. You can also complete the form on-line via (<https://adobeformscentral.com/?f=T9xU3yPQRQjc8zXudQFrog>).

**Dr Hongyun Tai (WINSS)**  
**School of Chemistry**  
**Bangor University**  
**Deiniol Road, Bangor**  
**LL57 2UW, UK**

<b>Your title (Mr, Ms, Mrs etc):</b> <b>Your name:</b>	<b>Gender:</b> (Male, Female)	<b>Date of Birth</b>	<b>Country of Birth</b>	<b>Nationality</b>
<b>Residential address</b>			<b>Contact Tel No.</b>	
<b>Email Address:</b>				
<b>Work address (if applicable) including the name of your current employer:</b>				
<b>Previous working experiences:</b> Please give details of any relevant employment (with dates) including work experience or voluntary work				
<b>Qualifications:</b> State the major/subject and the Year in which you obtained these qualifications. (Proof of your qualifications will be required when you enrol as a student at Bangor University)				
<b>Please tick the modules that you want to register for studying.</b>				
<b>Your choices</b>	<b>Module code</b>	<b>Module Title</b>	<b>Delivery Dates</b>	
	<b>FXW1001</b>	Chemistry in Everyday Life	9 <sup>th</sup> -11 <sup>th</sup> Sep 2013	
	<b>FXW1002</b>	Analytical Techniques	11 <sup>th</sup> -13 <sup>th</sup> Sep 2013	
	<b>FXW4001</b>	Glycobiology for Pharma Apps	30 <sup>th</sup> Oct, 6 <sup>th</sup> , 13 <sup>th</sup> , 20 <sup>th</sup> Nov	
	<b>FXW4002</b>	Polymeric Biomaterials	10 <sup>th</sup> -12 <sup>th</sup> Feb 2014	
	<b>FXX3503</b>	Research Skills	Oct-Dec, 2013	
	<b>FXX4999</b>	Laboratory Health and Safety	Oct-Dec, 2013	

	<b>FXX4519</b>	Modern Analytical Techniques	Oct-Dec, 2013
	<b>FXW4003</b>	Transferable Skills for Succeeding in your career in Chemical and Pharmaceutical Industry	In June or July 2014 (TBA)

**Welsh Language Ability**  
Do you speak Welsh? YES/NO  
If YES, would you like the University to communicate with you in Welsh? YES/NO

**Ethnicity** (Please indicate your ethnicity by ticking the correct option below)

11 – White British 12 - White – Irish 13 - White – Scottish 14 - White – Traveller 15 - White – Welsh 19 - Other white background 21 - Black or British Caribbean 22 - Black or British African 29 - Other Black background 31 - Asian or British Indian	32 - Asian or British Pakistani 33 - Asian or British Bangladeshi 34 – Chinese 39 - Other Asian Background 41 - Mixed White & Black Caribbean 42 - Mixed White & Black African 43 - Mixed White & Asian 49 - Other mixed background 80 - Other ethnic background
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**Do you have any medical condition or special need?** YES/NO,  
If yes, please specify by ticking the correct options below.

A – No Disability B - Aspergers/ Autistic spectrum C - Blind/visual impairment D - Deaf/hearing impairment E - Long standing illness	F - Mental Health G - Dyslexia/dyspraxia AD(H)D H - Mobility issues J - Multiple impairments T - Autistic Spectrum Disorder/AS Other:
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**- Do you have any criminal convictions (excluding motoring offences for which a fine and/or up to three penalty points were imposed)?** YES/NO

**- Residential Information**  
Have you lived in the UK/EU continuously, with the exception of holiday periods, since birth? YES/NO

If NO please answer the three questions below:  
Please state precisely where you have been resident during the last 10 years (including periods spent in further/higher education):

Do you require a Tier 4 General Student Visa to study in the UK? YES/NO (if yes, please supply a copy of your visa)

Is there any restriction on your eligibility to reside / work in the United Kingdom? YES/NO If the answer is YES, please specify such restrictions:

**DECLARATION**  
I hereby confirm that the information I have provided on this form is true, complete and accurate and that no information material to this application has been omitted.

Signature: ..... Date: .....

There are limited places for each training module, and they will be offered to the applicants on a first come first served basis. We strongly encourage you to apply as early as possible and we will confirm your place after receiving your application form. You will be sent the further information about the course and the location of the lecture rooms two weeks before the starting dates of the courses. You will also be advised on how to enrol as a student at Bangor University with no fee required so that you can receive the credits after you successfully complete the module(s).

*For more information about these modules, please refer to Table 1 on page 5, and the relevant sections in this leaflet, as well as the website (<http://www.bangor.ac.uk/chemistry/research/winss.php>).*



## Appendix III:



Please send your skills training request to us. We will discuss with you on your training needs and tailor the training program for you or your company. Please return to Dr Hongyun Tai via email ([winss@bangor.ac.uk](mailto:winss@bangor.ac.uk)). This form can be downloaded from the website (<http://www.bangor.ac.uk/chemistry/research/winss.php>)

**Wales Ireland Network for Scientific Skills (WINSS): Continuous Professional Development for Individuals and SMEs in the Sectors at the Interface of the Chemistry, Materials and the Life Sciences**

### Skills Training Needs Survey

**Section 1 – Company and Your information (If you are an unemployed individual, please state your personal information in the relevant sections)**

Organisation Name or Your name	
Address	
Name of Contact person (if applicable)	
Position in Organisation (if applicable)	
Email	
Telephone	
Website	
Number of employees	
Business activities	

### **Section 2 – Topics for Skills Training**

Please tick the skills training topics that you would like your employees to attend. If there are other training topics that you would like to be provided, please add them to the blank rows provided under each category:

Skills Training Topics	
<b>Essential Generic &amp; Transferable Skills for R&amp;D</b>	
Literature Search and Scientific Report Writing Skills	
Communication & IT Skills	
Data Handling & Analysis	

Laboratory Health & Safety	
Innovation & Research Commercialisation	
Project Management	
<b>Essential Synthetic Skills for Biomolecules and Biomacromolecules</b>	
Peptide Synthesis	
Carbohydrate Synthesis	
Carbohydrates and the Immune System	
Bioconjugates and Click Chemistry	
Biopolymers	
Biomaterials for Tissue Engineering and Drug Delivery	
Hydrogels for drug delivery	
Living/Controlled Free Radical Polymerisations for the Design of Well-defined Functional Biomacromolecules	
Dendrimers and Hyperbranched Polymers	
<b>Chromatography &amp; Mass Spectrometry: Analysis and understanding of your products</b>	
Flash Chromatography	
HPLC-MS	
GC-MS	
Matrix-Assisted Laser Desorption/Ionisation Time-of-Flight Mass Spectrometry (MALDI-TOF-MS)	
Gel Permeation Chromatography (GPC), to measure Molecular Weight and Molecular Weight Distribution of polymers	
<b>Spectroscopy: Analysis and understanding of your products</b>	
Nuclear Magnetic Resonance (NMR)	
Fourier Transform Infrared (FTIR)	
Atomic Absorption Spectroscopy (AA)	
Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES)	
Dynamic Light Scattering (DLS)	
UV and Fluorescence Spectroscopy	
<b>Thermal Analysis and Imaging Techniques: Analysis and understanding of your products</b>	
Differential Scanning Calorimetry (DSC)	
Thermal Gravimetric Analysis (TGA)	
Scanning Electron Microscopy (SEM)	
Atomic Force Microscopy (AFM)	
<b>Biomolecular Techniques</b>	
ELISA	
Cytotoxicity Assays	
Gel Electrophoresis (GE)	
Real-Time Polymerase Chain Reaction (PCR)	



DNA Sequencing	
<b>Others</b>	
Rheology of Polymers	
Polymer Processing	

### Section 3 – Your opinions:

1. Would you prefer your employees to:

- a. Attend intensive training workshops, for example, one-day, two-day or one-week? or
- b. Register full-time studies towards a qualification, for example postgraduate certificate, diploma, or a degree? or
- c. Register Part-time studies towards a qualification, for example postgraduate certificate, diploma, or degree?

Please also state briefly your reasons.

2. What level of Scientific Skills training is most needed for your employees, vocational, graduate or postgraduate?

3. Do you have any Research and Development projects on which you would like us to work in partnerships with you? If yes, please specify briefly.

4. Please add any comments you may have about the scientific skills training activities in the Ireland/Wales cross border region.

5. Would you be interested in participating in SMEs networking and forum events at Bangor University, where the WINSS team and SMEs can discuss the needs and approaches of the scientific skills training?

Thank you for completing this survey. Please return to Email: [winss@bangor.ac.uk](mailto:winss@bangor.ac.uk)



WINSS Project Welsh Partner representative

Dr Hongyun Tai

School of Chemistry

Bangor University, Bangor

Gwynedd, LL57 2UW, United Kingdom

Email: [winss@bangor.ac.uk](mailto:winss@bangor.ac.uk)

WINSS Project Irish Partner representative (Lead Partner)

Dr Peter McLoughlin

Head of Chemical & Life Sciences Department

PI of the Pharmaceutical & Molecular Biotechnology Research Centre (PMBRC)

Waterford Institute of Technology (WIT), Ireland

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