Course Handbook
MSc Synthetic Organic Chemistry
2020-21

Course Leader: Dr Robert Smith
School of Physical Sciences and Computing

Please read this Handbook in conjunction with the University’s Student Handbook.

All course materials, including lecture notes and other additional materials related to your course and provided to you, whether electronically or in hard copy, as part of your study, are the property of (or licensed to) UCLan and MUST not be distributed, sold, published, made available to others or copied other than for your personal study use unless you have gained written permission to do so from the Dean of School. This applies to the materials in their entirety and to any part of the materials.
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1. **Welcome to the course**

The School of Physical Sciences and Computing has the role of enhancing knowledge, understanding and application of chemical science, physical Sciences and computing by teaching, research and scholarship. The Section of Chemistry under Chemical Science is unique due to its existence in an interdisciplinary school.

Chemistry provides important understanding of our world and how it works. Through an understanding of the chemistry of materials we can design and manufacture drugs to fight diseases; computer chips to enhance communication; pesticides to protect our health and crops; fertilisers to grow abundant food; fuels for transportation; fibres to provide comfort and variety in clothes; plastics to package food and replace worn-out body parts; and much, much more.

Chemistry also helps us to comprehend the nature of our environment, our universe and ourselves. It is pivotal in our understanding of the treatment of diseases such as cancer and AIDS. It provides essential information about issues such as global warming, ozone depletion and acid rain.

Inorganic, Organic, Physical and Analytical Chemistry are the key areas and have been known for decades. Nowadays each area under chemistry has been explored as a multidisciplinary subject under several areas such as Forensic, Nanotechnology, Nano-biotechnology, Biotechnology, Materials, Polymers etc.

The School has staff members with outstanding academic profiles (teaching/ research) in the area of chemical sciences with Analytical, Physical, Organic and Inorganic chemistry expertise and multidisciplinary research track records. In addition, it has also got excellent state of the art facilities with a range of modern well-equipped laboratories in chemical and forensic sciences and located in a brand new building (J. B. Firth) due to the University’s recent strategic investment (£12M). A central analytical suite services the laboratories which means that students will have access to most modern analytical techniques to support practical investigations. More specialised equipment for research and project work is available through the Centre for Materials Science. The School also has strong links with several Chemical Industries in the UK and overseas.

Employability is central to this postgraduate course, which provides a broad perspective of analytical techniques covering both the analysis of organic and inorganic analytes in both liquid and solid form. Career opportunities are therefore maximised across the broadest possible range of employers within the chemicals sector and related industries ranging from pharmaceuticals to micro-electronics.
1.1 Rationale, aims and learning outcomes of the course

This list of the major learning outcomes of the programmes will give you an idea of the global learning goals. However in the module booklets you will see the syllabuses of the individual modules and their learning outcomes that will give your more information. You could also refer to the module descriptions, which are in effect summaries of the module booklets and are available on BlackBoard.

Aims

The programme has been designed to provide an in-depth study of a particular topic and develop critical and analytical skills involving the principles, practices and techniques of that specialist topic. The aims of the programme are:

- To extend students' comprehension of key chemical concepts and so provide them with an in-depth understanding of synthetic organic chemistry
- To provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes
- To develop in students the ability to adapt and apply methodology to the solution of unfamiliar types of problems in synthetic organic chemistry
- To instil a critical awareness of advances at the forefront of synthetic organic chemistry
- To prepare students effectively for professional employment or doctoral studies in the area of synthetic organic chemistry

Learning Outcomes

The programme provides opportunity for learners to achieve the following outcomes:

Knowledge and Understanding

- Assess an unfamiliar problem in synthetic organic chemistry and be able to design and implement a suitable solution.
- Present chemical information clearly and concisely
- Research information from literature/manuals/internet.
- Effectively plan a project and record data and their critical analysis.
- Design, plan and implement research questions to problems in synthetic organic chemistry including evaluation of hazards and environmental effects.
- Develop general strategies for synthetic organic chemistry including the identification of additional information required and problems where there is not a unique solution.

Subject Specific Skills

- Select appropriate techniques and procedures for the synthesis of specific compounds.
- Demonstrate competence in the planning, design and execution of experiments.
- Evaluate different potential solutions to an unfamiliar problem.
- Work independently, under minimum supervision, and be self-critical in the evaluation of risks, experimental procedures and outcomes.
- Use an understanding of the limits of accuracy of experimental data to inform the planning of future work.

Thinking Skills

- Evaluate technical and theoretical information
- Adapt and apply methodology to the solution of unfamiliar problems.
- Assimilate, evaluate and present research results objectively.
• Undertake an individual research project, the outcome of which is potentially publishable.
• Assess the success of such a project

Other skills relevant to employability and personal development
• Problem-solving skills including the demonstration of self-direction and originality
• Communicate and interact with professionals from other disciplines
• Ability to exercise initiative and personal responsibility
• Ability to make decisions in complex and unpredictable situations
• Independent learning ability required for continuing professional development.
• Work independently under minimum supervision.
• Develop and write a research project within guidelines and be able to assess the success of such a project.

It is often useful to know which learning outcomes will be covered in the different modules; hence it is highly recommended to see Appendix where you can see a table containing the curriculum skill map.

1.1 Course team
The course team is responsible for the academic delivery of the programme. The members of the course team are:

Jennifer Readman  BA (Hons Oxon) PhD (Inorganic Chemistry) MRSC  
e-mail: jereadman@uclan.ac.uk Ext: 3578 Room JBF109

Richard Hull    CSci CChem FRSC FHEA  
e-mail: trhull@uclan.ac.uk Ext 3543 Room JBF110

Antonios Kelarakis  BSc(Hons) Ph.D (Materials Chemistry)  
email: AKelarakis@uclan.ac.uk Ext 4172 Room JBF107

Chandrashekhar Kulkarni  BSc(Hons) Ph.D (Chemical Biology)  
email: CVKulkarni@uclan.ac.uk Ext 4339 Room JBF005

Runjie Mao    PhD (Analytical Chemistry)  
RMao1@uclan.ac.uk Ext.4156, JBF101

Subrayal Reddy  BSc (Hons), PhD (Electrochemistry), FRSC  
e-mail: smreddy@uclan.ac.uk Ext 3291 Room JBF005

Tapas Sen    BSc, MSc, PhD (Materials Chemistry), FHEA, FRSC  
e-mail: tsen@uclan.ac.uk Ext 4371 Room JBF017

Rob Smith    BSc (Hons), PhD (Organic Chemistry) MRSC  
e-mail: rbsmith@uclan.ac.uk Ext 4384 Room JBF006

Anna Stec    BSc, PhD (Fire Chemistry)  
e-mail: aastec@uclan.ac.uk Ext 3759 Room JBF108

Jioji N. Tabudravu  Dip Ed., BSc, MSc, PhD (Synthetic Organic Chemistry)  
e-mail: jtabudravu@uclan.ac.uk

Sergey Zlatogorsky  Hons Dip Specialist, PhD (Organometallic Chemistry)  
email: szlatogorsky@uclan.ac.uk Ext 4336 Room MB059

1.3 Expertise of staff
Most of the course is delivered by university staff but, where appropriate, experts in their own field are brought in to speak with authority from their own experience and expertise.
Staff in the chemistry teaching team are all qualified to postgraduate level, and have a wealth of teaching and research experience. Each member of the Chemistry team have held either postdoctoral research positions or industrial posts before joining UCLan. The chemistry team are aligned with the Centre for Materials Science (CMS). The CMS is an interdisciplinary research centre that provides a focus for the study of materials and their properties.

Particular areas of interest of the chemistry course team include:

- Nanomaterials
- Novel materials
- Porous materials
- Nuclear materials
- Organic optical materials
- Drug Design and Delivery
- Polymers
- Microwave technology
- Materials processes
- Theoretical modelling
- Fire toxicity and Fire Chemistry

For information about particular research areas, please refer to the materials webpages at [http://www.uclan.ac.uk/research/explore/themes/materials_science.php](http://www.uclan.ac.uk/research/explore/themes/materials_science.php)

1.4 Academic Advisor
You will be assigned an Academic Advisor who will provide additional academic advice and support during the year. They will be the first point of call for many of the questions that you might have during the year. Your Academic Advisor will be able to help you with personal development, providing insight and direction to enable you to realise your potential.

1.5 Administration details
Campus Admin Services provides academic administration support for students and staff and are located in the following hubs which open from 8.45am until 5.15pm Monday to Thursday and until 4.00pm on Fridays. The hub can provide general assistance and advice regarding specific processes such as extenuating circumstances, extensions and appeals.

**Allen Building**
Medicine
Dentistry
telephone: 01772 895566
e-mail: AllenHub@uclan.ac.uk

**Harris Building**
Lancashire Law School
Humanities and the Social Sciences
Centre for Excellence in Learning and Teaching
telephone: 01772 891996/891997
e-mail: HarrisHub@uclan.ac.uk

**Foster Building**
1.6 Communication
The University expects you to use your UCLan email address and check regularly for messages from staff. If you send us email messages from other addresses they risk being filtered out as potential spam and discarded unread. The team may also use Blackboard as a means to contact you or supply course information. Appointments to speak directly with academic staff can be made either in person or by email.

1.7 External Examiner
The University has appointed three External Examiners to your course who help to ensure that the standards of your course are comparable to those provided at other higher education institutions in the UK. The name of this person, their position and home institution can be found below. If you wish to make contact with your External Examiner, you should do this through your Course Leader and not directly. External Examiner reports will be made available to you electronically. The School will also send a sample of student coursework to the external examiner(s) for external moderation purposes, once it has been marked and internally moderated by the course tutors. The sample will include work awarded the highest and lowest marks and awarded marks in the middle range.

Prof. John Callan  Dr Dewi Lewis  Dr Tim Prior
Chair in Pharmaceutical Science  Senior Lecturer in Physical Chemistry  Lecturer in Inorganic Chemistry
Ulster University  University College London  University of Hull
2. Structure of the course

2.1 Overall structure

The course is a three-part full time programme which lasts for 45 weeks. The first two semesters are approximately 15 weeks long and correspond to the two University semesters and the third semester of 16 weeks is over the summer period.

There are two intermediate exit points designed into the course. A student who successfully completes three modules may be eligible for a Postgraduate Certificate (PgCert). This is dependent on passing the modules required for the exit award as shown in the programme specification which can be found in the appendix at the back of this handbook.

A student who successfully completes six modules is eligible for a Postgraduate Diploma (PgDip).

2.2 Modules available

The content of the modules are outlined below.

**FZ4810 Professional Research Skills**
Scientists are required to have a wide range of skills beyond the expertise in their specialist subject. This module provides the necessary skills in technical documentation, project management, data analysis and retrieval etc. that are required.

**FZ4006 Research Project**
You will spend 16 weeks undertaking a project which uses and enhances many of the skills learnt on the course. The majority of students will undertake their project at the University, but the opportunity will exist for students to do their project at other relevant institutions. Following the conclusion of the work, you will complete a report on the project as well as give a presentation of your finding and defend your work during the viva examination.

**FZ4008 Industrial placement**
This module allows students to develop an understanding of the professional practices associated with working in the chemical industry. Students will research, secure and undertake a period of work experience with the help of their dissertation supervisor at the middle of 3rd semester as a part of industrial placement in an organisation appropriate to the field of study.

**FZ4601 Separation Science and Mass Spectrometry**
In this module you will develop understanding of the underlying principles of current separation technologies and mass spectrometry. You will also develop an important skill where you will be able to critically appraise scientific methods and data.

**FZ4603 Molecular Spectroscopy**
In this module you will develop a systematic understanding and critical awareness of the full analytical potential of the interaction of each part of the electromagnetic spectrum with matter.

**FZ4605 Organic Synthetic Methods**
In this module, you will develop a thorough understanding of the reagents, reactions and procedures used in organic synthesis and mechanistic consequences of synthetic organic reactions. It will also help you to discriminate between alternative synthetic routes to a complex target molecule and recognising which routes will have the highest potential of success. Finally, it will ensure that you have the ability to apply these potential routes to the design of successful syntheses of complex target molecules.
**FZ4802 Applications in Synthesis and Molecular Modelling**

The aim of this module is to allow you to develop an advanced knowledge and understanding of natural and synthetic chemistry and the application of molecular modelling in the drug discovery process.

**Delivery method**

Most of the modules that you will study in Semesters 1 and 2 of the Programme will consist of lectures and practical sessions/tutorials. Typically, as a full time student you are expected to study for 12 hours per week per module which may be broken down into lectures, practical classes, seminars, tutorials and independent study (in the library, laboratory or at home). This amounts to a minimum of 36 hours per week. **Any lesser commitment than this is unlikely to produce a good degree.**

Students should bear this in mind if you are going to undertake part-time employment. Students’ first commitment must be to the course: if you are a full-time student it means just that.

Semester 3 of the course is the only Research Project when students will be expected to spend approximately 14 weeks undertaking a project either at the University or on the premises of another suitable establishment. This will be followed by a 2-week period during which you will complete your report and prepare for your presentation. Whilst conducting your project, you will be expected to normally work on your project for at least 36 hours per week.

In the 2nd year, students will have their optional module FZ4008, Industrial Placement.

The amount of time spent in private study will vary from student to student and will depend on your academic ability. The recommended time should therefore in practice be taken as a minimum value.

**2.3 Course requirements**

Specific entry requirements for this course are that a student must hold one of the following qualifications:

Honours degree of the level 2.2 or above from a United Kingdom university or its equivalent.

Applications from individuals with non-standard qualifications or relevant work / life experience who can demonstrate the ability to cope with and benefit from degree-level studies are especially welcome to apply, and may be interviewed.

Applicants will be required to have a minimum level of proficiency in English Language equivalent to IELTS grade 6.5.

**2.4 Module Registration Options**

As this is a one year course with the possibility of an optional placement module FZ4008 in the 2nd year hence the progression to 2nd year will be based on the performance from semesters 1 and 2 and a suitable placement offer in place before the start of the dissertation module FZ4006 at the beginning of 3rd semester.
2.5 Study Time

2.5.1 Weekly timetable
A timetable will be available once you have enrolled on the programme, through the student portal.

2.5.2 Expected hours of study
20 credits is a standard module size and equals 200 notional learning hours.

The normal amount of work involved in achieving a successful outcome to your studies is to study for 10 hours per each credit you need to achieve – this includes attendance at UCLan and time spent in private study.

You are therefore expected to spend a total of 200 hours on each module. It is important that you allocate time reasonably equally to all modules constantly throughout the academic year if you want to gain a good honours degree.

On average then, you should be planning to do between 36 and 40 hours per week. Any lesser commitment is unlikely to produce a good degree. You should bear this in mind if you intend to undertake part-time employment or pursue other interests outside the curriculum.

2.5.3 Attendance Requirements
You are required to attend all timetabled learning activities for each module. Notification of illness or exceptional requests for leave of absence must be made to: FOSTER HUB in a timely fashion.

All UCLan students are monitored on the Student Attendance Monitoring (SAM) system. In chemistry, each student’s attendance is reviewed weekly. If you miss classes you may be asked to discuss your progress and commitment with the Course Leader. If you are unable to explain your absences you may be asked to see the Academic Lead. You may wish to check your attendance record through my UCLan.

If you have not gained the required authorisation for leave of absence, do not respond to communications from the University, and if you are absent for four weeks or more, you may be deemed to have withdrawn from the course. If this is the case, then the date of withdrawal will be recorded as the last day of attendance.

Some international students will have their attendance at specific classes monitored closely. If you are in this category under the UK Border Agency (UKBA), Points Based System (PBS) you MUST attend your course of study regularly; under PBS, UCLan is obliged to tell UKBA if you withdraw from a course, defer or suspend your studies, or if you fail to attend the course regularly.

Each time you are asked to enter your details on SAM you must remember that the University has a responsibility to keep information up to date and that you must only enter your own details on the system. To enter any other names would result in inaccurate records and be dishonest. Any student who is found to make false entries can be disciplined under the student guide to regulations.
3. Approaches to teaching and learning

3.1 Learning and teaching methods

The programme is designed to produce graduates with both general and specific skills pertinent to the area studied. The course is assessed by both coursework and examination to ensure that your knowledge and abilities are fully evaluated.

The course will be delivered by lectures, tutorials and practical sessions. The practical sessions will be dependent upon the particular programme being followed and specialist laboratories will be used when appropriate. Some specialist equipment may only be available in certain rooms. Rooms will generally be open during normal university working hours, i.e. Monday to Friday, 0800-1700.

All single credit modules will be delivered in semesters 1 and 2.

Final semester (3rd) has been solely kept for your research project in order to work independently, under minimum supervision, and be self-critical in the evaluation of risks, experimental procedures and outcomes. The nature of the work and the interaction with other researchers that is needed to complete the project will all contribute to the experience.

2nd year can be used for optional module FZ4008, Industrial placement where student should work in an industry in collaboration with students’ 3rd semester dissertation supervisor. Students will be expected to reflect upon their placement work experience critically and to apply their experience to theoretical and practical elements of their course.

You will find that the pace of delivery and demands of practical sessions will increase as you progress through the modules in semester 1.

The assessment strategies of the course have been developed so that you are assessed in the way that is the most appropriate to the area of study. Therefore some modules will be assessed by coursework only whilst others will have formal examinations where this is the best way to assess your knowledge and understanding of the subject area and your ability to apply it.

3.2 Study skills

Study Skills - ‘Ask Your Librarian’

https://www.uclan.ac.uk/students/support/study/it_library_trainer.php

You can book a one to one session with a subject Librarian via Starfish. These sessions will help with questions such as “My lecturer says I need a wider variety of sources in my references, what do I do?”

"I need to find research articles, where do I start?"

"How do I find the Journal of ...?"

"How do I use RefWorks?"

General study skills are taught early in the degree: you will be taught how to take advantage of the resources available through the library, including a huge array of online materials.

For general study skills, there are a variety of services to support students; these include: WISER https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab_tab_group_id=33_1
LIS https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab_tab_group_id=25_1
3.3 Learning resources
3.3.1 Learning and Information Services (LIS)

The best place to start when exploring the Library resources available to you is;
• Your ‘Subject Guide’ can be found in the Library Resources
• Your ‘My Library’ tab in the Student Portal
• Library search

Extensive resources are available to support your studies provided by LIS – library and IT staff. Take advantage of the free training sessions designed to enable you to gain all the skills you need for your research and study.

LIS provide access to a huge range of electronic resources – e-journals and databases, e-books, images and texts.

3.3.2 Electronic Resources

LIS provide access to a huge range of electronic resources – e-journals and databases, e-books, images and texts.

Lecturers and relevant module tutors will make material relevant to their modules available on Blackboard, the University’s online learning platform. This material could include lecture notes, tutorial examples and solutions, past exam papers, links to online resources, and so on.

3.4 Personal development planning

While you are at university, you will learn many things. You already expect to learn lots of facts and techniques to do with chemistry, but you will also learn other things of which you might be unaware. You will learn how to study, how to work with other people, how to manage your time to meet deadlines, and so on. If you are to be an employable graduate it is vital that you can list in your CV the skills that employers value.

Employers are looking for skills such as:

• self-organisation
• team work
• good written communication
• good oral communication
• problem solving

To help you, we have introduced a system that aims to:
• help you to identify the skills you should be developing,
• help you to identify the ones you are weak in, and
• to take action to improve those skills.

This approach can broadly be described as Personal Development Planning, and can be defined as:

A structured and supported process undertaken by an individual to reflect upon their own learning, performance and/or achievement and to plan for their personal, educational and career development.

The University puts a high priority on your personal development, and so keeping a record of your achievements is encouraged and will help when you are applying
for jobs. When you ask staff for a reference, they could use this information to help them provide more rounded detail.

3.5 Preparing for your career
Your future is important to us, so to make sure that you achieve your full potential whilst at university and beyond, your course has been designed with employability learning integrated into it. This is not extra to your degree, but an important part of it which will help you to show future employers just how valuable your degree is. These “Employability Essentials” take you on a journey of development that will help you to write your own personal story of your time at university:

- To begin with, you will explore your identity, your likes and dislikes, the things that are important to you and what you want to get out of life.
- Later, you will investigate a range of options including jobs and work experience, postgraduate study and self-employment,
- You will then be ready to learn how to successfully tackle the recruitment process.

It’s your future: take charge of it!

Careers offers a range of support for you including:-
- career and employability advice and guidance appointments
- support to find work placements, internships, voluntary opportunities, part-time employment and live projects
- workshops, seminars, modules, certificates and events to develop your skills

Daily drop in service available from 09:00-17:00 for CV checks and initial careers information. For more information come along and visit the team (in Foster building near the main entrance) or access our careers and employability resources via the Student Portal.

On completing of postgraduate degree from University with a degree in Chemistry the possibilities are almost endless. Obviously, the prospective material rewards (and security of employment) are of importance but what of the chance to make contributions that impact on Society?

Your employment potential with an MSc in Synthetic Organic Chemistry should be very high, whether or not you exploit your qualifications explicitly, and a career actually involving Chemistry would certainly be relevant and meaningful.

The chemical industry provides direct employment for 214,000 people within the UK and supports several hundred thousand additional jobs throughout the economy. 23% of the UK chemical industry is based within the NW region. The UK chemicals industry out performs virtually all other UK manufacturing industries with an average growth rate of 2.9% compared to a 0.5% for all other manufacturing industries. The importance of the UK chemical industry to the balance of trade for the country cannot be over stated, it is the UK manufacturing number one exporter with a trade surplus of £4.5 billion. This has obvious implications on employment prospects, which are generally considered to be good with a wide variety of industries employing chemists in areas such as pharmaceuticals, paints, soaps and toiletries, plastics etc. Remuneration is again above average with salaries in the sector currently 19% higher than the average in manufacturing generally.

Your University experience is not only about achieving your chosen award, it is also about developing as a person and realising your potential. We want you to gain the skills and attitudes that will help you to achieve your goals and aspirations.
4. Student Support

Information on the support available is at: https://www.uclan.ac.uk/students/

Your primary contact for advice on general academic matters is your academic advisor. They will advise you on matters like progression, modules, and so on. They also have a role in pastoral care, and can advise you on who to talk to in the university about a range of problems. In addition, there is the general advice desk for students called ‘The i’ – this is described below.

The ‘i’ is a central Student Information Centre and your first point of contact. You can obtain information on a wide range of topics including Council Tax Exemption Certificates, Bank and Confirmation of Study Letters, Portable Financial Credits, (continuing students only), Printing and Printer Credit, UCLan Cards, the ‘i’ shop and UCLan Financial Support Bursary (first year students only).

4.1 Academic Advisors

Your primary contact for advice on general academic matters is your academic advisor. They will advise you on matters like progression, modules, and so on. They also have a role in pastoral care, and can advise you on who to talk to in the university about a range of problems. In addition, there is the general advice desk for students called ‘The i’ – this is described below.

4.2 Students with disabilities

Assessment arrangements for students with a disability

Arrangements are made for students who have a disability/learning difficulty for which valid supporting evidence can be made available. Contact the Disability Adviser for advice and information, disability@uclan.ac.uk

4.3 Students’ Union

The Students’ Union offers thousands of volunteering opportunities ranging from representative to other leadership roles. We also advertise paid work and employ student staff on a variety of roles. You can find out more information on our website: http://www.uclansu.co.uk/

5. Assessment

5.1 Assessment Strategy

Please note that all modules will be assessed. You are expected to attempt all required assessments for each module for which you are registered, and to do so at the times scheduled unless authorised extensions, special arrangements for disability, or extenuating circumstances allow you to defer your assessment.

Several different types of assessment are used in the course including reports, log book/diaries, problem solving, oral presentations, dissertations etc. In each case there are a number of common elements. The criteria listed in the following pages are the main ones used for marking. Different assessment types will contain different balances of criteria.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Methods</th>
<th>Problem-solving</th>
<th>Conceptual understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding/ Excellent/ Very Good 70-100%</td>
<td>Error-free Application of methods to a range of easy and hard problems</td>
<td>Thorough grasp of complex problems, possible solutions and their limitations</td>
<td>Thorough grasp of the underlying concepts</td>
</tr>
<tr>
<td>Good (above average) 60-69%</td>
<td>Some errors in complex problems</td>
<td>Thorough grasp of problems but incomplete understanding of limitations of solutions</td>
<td>A grasp of most of the underlying concepts</td>
</tr>
<tr>
<td>Average 55-59%</td>
<td>Able to apply methods to a range of problems, some non-standard</td>
<td>Able to solve some complex problems, with some indication of limitations</td>
<td>A superficial understanding of the concepts with indications of the students limitations</td>
</tr>
<tr>
<td>Satisfactory (below average) 50-54%</td>
<td>Able to apply methods to a range of simple problems</td>
<td>Able to produce simple solutions to easy problems</td>
<td>Limited conceptual understanding</td>
</tr>
<tr>
<td>Bare minimal pass 50%</td>
<td>Able to apply methods to some simple problems; often with errors</td>
<td>An understanding of simple problems, with some idea of appropriate solutions</td>
<td>An understanding of only very simple concepts with conceptual gaps and misunderstandings</td>
</tr>
<tr>
<td>Fail &lt;50%</td>
<td>Failure to apply methods to simple problems, or many errors</td>
<td>Failure to understand the nature of the problem</td>
<td>No grasp of even the simplest concepts</td>
</tr>
<tr>
<td>Classification</td>
<td>Work done</td>
<td>Motivation</td>
<td>Group work</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Outstanding/ Excellent/ Very Good</td>
<td>Considerable work done, excellent experimental technique and achievement</td>
<td>Highly self motivated and high level of initiative</td>
<td>Well organised task management with clear delineation of roles within the group</td>
</tr>
<tr>
<td>70-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good (above average) 60-69%</td>
<td>Clear evidence of work done, good experimental technique and significant achievement</td>
<td>Self motivated but requiring some staff help occasionally</td>
<td>Organised task management with some delineation of roles within the group</td>
</tr>
<tr>
<td>Average 55-59%</td>
<td>Reasonable amount of work done, adequate experimental technique and achievement</td>
<td>Student requires a moderate level of staff involvement to sustain the work</td>
<td>Task management is subdivided within the group but not very clearly</td>
</tr>
<tr>
<td>Satisfactory (below average) 50-54%</td>
<td>Some evidence of work done, poor experimental technique and some identifiable achievement even if not the original aim</td>
<td>Student shows little self motivation or initiative and requires a lot of staff involvement</td>
<td>Task management is poorly subdivided within the group and there is some confusion over roles</td>
</tr>
<tr>
<td>Bare minimal pass 50%</td>
<td>Small amount of work done with a small but identifiable achievement; experimental technique is very poor</td>
<td>Student shows little motivation and requires considerable staff involvement</td>
<td>Task management is ineffectively subdivided within the group and there is confusion about job allocation</td>
</tr>
<tr>
<td>Fail &lt;50%</td>
<td>Inadequate work and achievement; inadequate experimental technique</td>
<td>No motivation and lack of positive input into the project</td>
<td>No attempt to work as a group</td>
</tr>
<tr>
<td>Classification</td>
<td>Relevance</td>
<td>Knowledge</td>
<td>Analysis</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Outstanding/ Excellent/ Very Good</td>
<td>Directly relevant to the title; able to address the implications, assumptions and nuances of the title</td>
<td>Makes effective use of excellent knowledge and thorough understanding of the relevant material</td>
<td>A very good analysis of the evidence, arguments or results, giving clear illuminating conclusions</td>
</tr>
<tr>
<td>70-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good (above average) 60-69%</td>
<td>Directly relevant to the title</td>
<td>A substantial knowledge and understanding of the relevant material</td>
<td>Good analysis, clear and orderly</td>
</tr>
<tr>
<td>Average 55-59%</td>
<td>Some attempt to address the title, may drift away from the title in the less focussed passages</td>
<td>Adequate knowledge of a fair range of the relevant material with intermittent evidence of understanding</td>
<td>Some analytical treatment but may be prone to description or lacking in analytical purpose</td>
</tr>
<tr>
<td>Satisfactory (below average) 50-54%</td>
<td>Some significant degree of irrelevance to the title is common</td>
<td>Basic understanding of a limited range of material</td>
<td>Largely descriptive with little evidence of analytical skill</td>
</tr>
<tr>
<td>Bare minimal pass 50%</td>
<td>Relevance to the title may be intermittent; the topic may be reduced to its vaguest and least challenging terms</td>
<td>A limited understanding of a narrow range of material</td>
<td>Mainly descriptive with little analytical content</td>
</tr>
<tr>
<td>Fail &lt;50%</td>
<td>Outright irrelevance to the title</td>
<td>Lack of basic knowledge necessary for an understanding of the topic</td>
<td>Inadequate description and no analysis</td>
</tr>
<tr>
<td>Classification</td>
<td>Structure</td>
<td>Originality</td>
<td>Presentation</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Outstanding/ Excellent/ Very Good 70-100%</td>
<td>Coherently and logically structured, making use of appropriate standard formats</td>
<td>Distinctive work showing independent thought and critical judgement</td>
<td>Very well presented on good English and correct spelling and syntax; creative use of IT and inclusion of bibliography and clear instructive diagrams</td>
</tr>
<tr>
<td>Good (above average) 60-69%</td>
<td>Generally coherent and logical structure</td>
<td>May contain some distinctive or independent work and some evidence of critical judgement</td>
<td>Well written, with good style, spelling and syntax, acceptable use of IT, diagrams and bibliography</td>
</tr>
<tr>
<td>Average 55-59%</td>
<td>Some attempt at using a logical structure and/or standard format</td>
<td>Sound work but showing no distinctive elements; conforming to standard patterns of approach</td>
<td>Competently written with only minor errors of spelling and syntax. Acceptable use of IT, diagrams and bibliography</td>
</tr>
<tr>
<td>Satisfactory (below average) 50-54%</td>
<td>A basic argument may be evident, but tends to lack clarity</td>
<td>Largely derivative showing little originality of approach</td>
<td>Rather poorly written with numerous lapses of spelling and syntax; poor diagrams, use of IT and bibliography</td>
</tr>
<tr>
<td>Bare minimal pass 50%</td>
<td>Little evidence of a logical structure</td>
<td>Mostly derivative</td>
<td>Poorly presented with numerous lapses of spelling, syntax and poor diagrams</td>
</tr>
<tr>
<td>Fail &lt;50%</td>
<td>No evidence of clear and logical structure</td>
<td>No originality shown</td>
<td>Garbled and negligently presented</td>
</tr>
</tbody>
</table>
5.2 Notification of assignments and examination arrangements
Because different modules will be assessed in different ways, there is no central rule for when or how assessments should be submitted. For each module, when there is an assessed piece of work to be done the module tutor will give you an assignment brief which tells what, when and how to submit the resulting work. The tutor will also give some indication of how the work will be marked. The majority of assessments will be submitted via turn-it-in on Blackboard. Most of the submitted assignments will be marked via blackboard using Grade mark hence students will be able to see the assignment feedback online via blackboard.

Reassessment
If you fail a module you may be offered reassessment for a maximum of 50%. However, these students, along with those who do not seek reassessment or who fail reassessment may be considered for the awards of PgCert or PgDip.

5.3 Referencing
The main referencing system chemists use is numerical (Vancouver) referencing. More information can be found in “Study and Communication Skills for the Chemical Sciences” by Overton, Johnson & Scoot which is available in the UCLan Library.

5.4 Confidential material
Within your course you are unlikely to have access to confidential information during the course. However, if you do, it is important to respect confidentiality. Any students who have to deal with confidential material will be briefed on this by their tutor at the time.

5.5 Cheating, plagiarism, collusion or re-presentation
Please refer to the information included in section 6.6 of the University Student Handbook for full definitions. The University uses an online Assessment Tool called Turnitin. A pseudo-Turnitin assignment will be set up using the School space on Blackboard to allow students to check as many drafts as the system allows before their final submission to the ‘official’ Turnitin assignment. Students are required to self-submit their own assignment on Turnitin and will be given access to the Originality Reports arising from each submission. In operating Turnitin, Schools must take steps to ensure that the University’s requirement for all summative assessment to be marked anonymously is not undermined and therefore Turnitin reports should either be anonymised or considered separately from marking. Turnitin may also be used to assist with plagiarism detection and collusion, where there is suspicion about individual piece(s) of work.

5.6 How do I know that my assessed work had been marked fairly?
Assessment is an integral part of the course. Module staff work closely together to design assessments, agree the marking criteria and approve final versions of assessments to ensure that these are appropriate. The criteria for assessment will be communicated to you clearly during the module teaching.

All module staff engage in development and training in assessment, marking and feedback. Once the assessments have been completed the module team will discuss the assessment methods and marking criteria, prior to starting to mark, so that there is a common understanding of what is expected of students. All assessed modules have moderation built into the marking process. Moderation involves sampling students’ assessed work to make sure that the learning outcomes and agreed marking criteria have been interpreted and applied in the same way. This ensures that you and your fellow students are treated equitably and that the academic standards are applied consistently. During the marking process the module leader will co-ordinate moderation to ensure that at least 10% of assessed work (or a minimum of three pieces) has been reviewed by other markers and any concerns about consistency or
accuracy addressed with the whole module team. Your work may or may not be part of this sample, but the processes for developing assessments and marking criteria as well as moderation mean that you can be confident that teaching staff are marking assessments to the same criteria. Module teams may then use feedback from moderation to improve clarity about the nature and purpose of future assessment, or to make changes if required.

Modules are also moderated externally. The module leader will arrange for the external examiner to receive a sample of work for review and comment. External examiners cannot change individual grades, but can act as 'critical friends' and confirm that marking standards are in line with other, similar courses in the sector. If, on reviewing the sample, external examiners feel that the marking criteria have not been applied consistently the work of the whole cohort will be reviewed.

6. Classification of Awards
The University publishes the principles underpinning the way in which awards and results are decided in Academic Regulations. Decisions about the overall classification of awards are made by Assessment Boards through the application of the academic and relevant course regulations.

7. Student Feedback
You can play an important part in the process of improving the quality of this course through the feedback you give.

7.1 Student Staff Liaison Committee meetings (SSLCs)
Details of the Protocol for the operation of SSLCs is included in section 8.2 of the University Student Handbook.

The purpose of a SSLC meeting is to provide the opportunity for course representatives to feedback to staff about the course, the overall student experience and to inform developments which will improve future courses. These meetings are normally scheduled once per semester.

Your Course Leader will facilitate the meetings using guidelines and provide a record of the meeting with any decisions and / or responses made and / or actions taken as a result of the discussions held. The meetings include discussion of items forwarded by course representatives, normally related to the following agenda items (dependent on time of year).

The course team encourage student feedback in all areas and recognise that additional items for discussion may also be raised at the meeting
- Update on actions completed since the last meeting
- Feedback about the previous year – discussion of external examiner’s report; outcomes of National /UCLan student surveys.
- Review of enrolment / induction experience;
- Course organisation and management (from each individual year group, and the course overall);
- Experience of modules - teaching, assessment, feedback;
- Experience of academic support which may include e.g. Personal Development Planning, personal tutoring arrangements and The Card;
- Other aspects of University life relevant to student experience e.g. learning resources, IT, library;
- Any other issues raised by students or staff.

Course representatives are volunteers. If you wish to be considered as a course representative, please contact the course leader.
The dates of SSLC meetings are emailed to the students directly and module tutors and lecturers will also remind students during their lectures; minutes of the meetings are made available through the chemistry blackboard site.
### Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

**Sources of information on the programme can be found in Section 17**

<table>
<thead>
<tr>
<th>1. Awarding Institution / Body</th>
<th>University of Central Lancashire</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Teaching Institution and Location of Delivery</td>
<td>University of Central Lancashire Preston Campus</td>
</tr>
<tr>
<td>3. University School/Centre</td>
<td>Physical Sciences and Computing</td>
</tr>
<tr>
<td>4. External Accreditation</td>
<td>None</td>
</tr>
<tr>
<td>5. Title of Final Award</td>
<td>MSc Synthetic Organic Chemistry</td>
</tr>
<tr>
<td>6. Modes of Attendance offered</td>
<td>Full-time</td>
</tr>
<tr>
<td>7. a) UCAS Code</td>
<td></td>
</tr>
<tr>
<td>b) JACS Code</td>
<td></td>
</tr>
<tr>
<td>8. Relevant Subject Benchmarking Group(s)</td>
<td>Chemistry QAA Masters Degree Characteristics</td>
</tr>
<tr>
<td>9. Other external influences</td>
<td>Royal Society of Chemistry</td>
</tr>
<tr>
<td>10. Date of production/revision of this form</td>
<td>April 2017</td>
</tr>
</tbody>
</table>

#### 11. Aims of the Programme

- To extend students' comprehension of key chemical concepts and so provide them with an in-depth understanding of synthetic organic chemistry
- To provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes
- To develop in students the ability to adapt and apply methodology to the solution of unfamiliar types of problems in synthetic organic chemistry
- To instil a critical awareness of advances at the forefront of synthetic organic chemistry
- To prepare students effectively for professional employment or doctoral studies in the area of synthetic organic chemistry
### 12. Learning Outcomes, Teaching, Learning and Assessment Methods

#### A. Knowledge and Understanding

| A1. | Assess an unfamiliar problem in synthetic organic chemistry and be able to design and implement a suitable solution. |
| A2. | Present chemical information clearly and concisely |
| A4. | Effectively plan a project and record data and their critical analysis. |
| A5. | Design, plan and implement research questions to problems in synthetic organic chemistry including evaluation of hazards and environmental effects. |
| A6. | Develop general strategies for synthetic organic chemistry including the identification of additional information required and problems where there is not a unique solution. |

#### Teaching and Learning Methods

Lectures, seminars, structured laboratory classes, practical projects

#### Assessment methods

Exams, Laboratory reports, project report group and individual presentations

#### B. Subject-specific skills

| B1. | Select appropriate techniques and procedures for the synthesis of specific compounds. |
| B2. | Demonstrate competence in the planning, design and execution of experiments |
| B3. | Evaluate different potential solutions to an unfamiliar problem. |
| B4. | Work independently, under minimum supervision, and be self-critical in the evaluation of risks, experimental procedures and outcomes. |
| B5. | Use an understanding of the limits of accuracy of experimental data to inform the planning of future work. |

#### Teaching and Learning Methods

Lectures, seminars, structured laboratory classes, directed reading, group and individual projects and presentations.

#### Assessment methods

Exams, Laboratory reports, project report group and individual presentations

#### C. Thinking Skills

| C1. | Evaluate technical and theoretical information |
| C2. | Adapt and apply methodology to the solution of unfamiliar problems. |
| C3. | Assimilate, evaluate and present research results objectively. |
| C4. | Undertake an individual research project, the outcome of which is potentially publishable. |
| C5. | Assess the success of such a project |

#### Teaching and Learning Methods

Skills developed through seminars, data interpretation, case studies, practical work, research projects, presentations, problem solving.

#### Assessment methods

Practical reports, essays and group and individual presentations.

#### D. Other skills relevant to employability and personal development

| D1. | Problem-solving skills including the demonstration of self-direction and originality |
| D2. | Communicate and interact with professionals from other disciplines |
| D3. | Ability to exercise initiative and personal responsibility |
| D4. | Ability to make decisions in complex and unpredictable situations |
| D5. | Independent learning ability required for continuing professional development. |
| D6. | Work independently under minimum supervision. |
| D7. | Develop and write a research project within guidelines and be able to assess the success of such a project. |

#### Teaching and Learning Methods

Skills developed through seminars, data interpretation, case studies, practical work, research projects, presentations, problem solving.

#### Assessment methods

Exams, Laboratory reports, project report group and individual presentations.
13. Programme Structures*

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 7</td>
<td>FZ4810</td>
<td>Professional Research Skills</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FZ4006</td>
<td>MSc Chemistry Research Project</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>FZ4601</td>
<td>Separation Science and Mass Spectrometry</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FZ4603</td>
<td>Molecular spectroscopy</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FZ4605</td>
<td>Organic Synthetic Methods</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FZ4802</td>
<td>Applications in Synthesis and Molecular Modelling</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FZ4008</td>
<td>Professional Industrial Placement (O)</td>
<td>60 (notional)</td>
</tr>
</tbody>
</table>

14. Awards and Credits*

- **MSc in Synthetic Organic Chemistry**
  - Requires 180 credits at Level 7
- **MSc with Distinction, APM and MSc Chemistry Project ≥ 70%**
- **MSc with Merit, APM and MSc Chemistry Project ≥ 60%**

**Postgraduate Diploma in Synthetic Organic Chemistry**
- Requires 120 credits at Level 7

**Postgraduate Certificate in Synthetic Organic Chemistry**
- Requires 60 credits at Level 7
- Optional professional placement route requires successful completion of FZ4008 which has a notional credit value of 60.

15. Personal Development Planning

PDP is embedded and monitored through the modules that make up the course, particularly the skills modules, and the personal tutor system. Students are introduced to the idea of PDP and career planning through sessions in induction week, and are provided with a PDP folder which provides information about opportunities for PDP and the School Guide to PDP called ‘Developing in all the Right Ways’ and provides a place to keep any information and/or evidence which the student wishes to keep to hand. Reflection and self-assessment on their achievements and goal setting is developed in many of the core modules and through the feedback provided on assessment coversheets. Regular meetings with personal tutors are used to discuss development and reflection.

16. Admissions criteria

Applicants will normally be required to have:

- 2:2 Hons Degree in Chemistry or equivalent qualifications and experience.

Applicants will be required to have a minimum level of proficiency in English Language equivalent to IELTS grade 6.5.

Please consult the UCLAN admissions department for the most up to date requirements.

17. Key sources of information about the programme

- University web site (www.uclan.ac.uk)
- School website (www.uclan.ac.uk/chemistry)
- Course Leader
- Admissions tutor
# 18. Curriculum Skills Map

*Please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed*

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Core (C), Compulsory (COMP) or Option (O)</th>
<th>Knowledge and understanding</th>
<th>Programme Learning Outcomes</th>
<th>Thinking Skills</th>
<th>Other skills relevant to employability and personal development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
</tr>
<tr>
<td>LEVEL 7</td>
<td>FZ4810</td>
<td>Professional Research Skills</td>
<td>COMP</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>FZ4006</td>
<td>MSc Chemistry Research Project</td>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td></td>
<td>FZ4601</td>
<td>Separation Science and Mass Spectrometry</td>
<td>COMP</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>FZ4603</td>
<td>Molecular spectroscopy</td>
<td>COMP</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td></td>
<td>FZ4605</td>
<td>Organic Synthetic Methods</td>
<td>COMP</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>FZ4802</td>
<td>Applications in Synthesis and Molecular Modelling</td>
<td>COMP</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>FZ4008</td>
<td>Professional Industrial Placement</td>
<td>O</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Note:** Mapping to other external frameworks, e.g. professional/statutory bodies, will be included within Student Course Handbooks.
Learning outcomes for the award of Postgraduate Diploma in Synthetic Organic Chemistry:

A1. Assess an unfamiliar problem in synthetic organic chemistry and be able to design and implement a suitable solution.
A2. Present chemical information clearly and concisely
A3. Research information from literature/manuals/internet

B1. Select appropriate techniques and procedures for the synthesis of specific compounds.
B2. Demonstrate competence in the planning, design and execution of experiments
B3. Evaluate different potential solutions to an unfamiliar problem.

C1. Evaluate technical and theoretical information
C2. Adapt and apply methodology to the solution of unfamiliar problems.
C3. Assimilate, evaluate and present research results objectively.

D1. Problem-solving skills including the demonstration of self-direction and originality
D2. Communicate and interact with professionals from other disciplines
D3. Ability to exercise initiative and personal responsibility
D4. Ability to make decisions in complex and unpredictable situations

Learning outcomes for the award of Postgraduate Certificate in Synthetic Organic Chemistry:

A1. Assess an unfamiliar problem in synthetic organic chemistry and be able to design and implement a suitable solution.
A2. Present chemical information clearly and concisely

B1. Select appropriate techniques and procedures for the synthesis of specific compounds.

C1. Evaluate technical and theoretical information
C2. Adapt and apply methodology to the solution of unfamiliar problems.

D1. Problem-solving skills including the demonstration of self-direction and originality