

**Programme Specification**

**Title of Course:** MChem (Hons) Chemistry with Medicinal Chemistry

 MChem (Hons) Chemistry with Medicinal Chemistry with Professional Placement

 MChem (Hons) Chemistry with Medicinal Chemistry (International Exchange)

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| **Date first produced** | February 2021 |
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| **Date of implementation of current version** |  |
| **Version number** |  |
| **Faculty** | The Faculty of Health, Science, Social Care and Education |
| **School** | School of Life Sciences, Pharmacy and Chemistry |
| **Department**  | Department of Chemical and Pharmaceutical Sciences |
| **Delivery Institution** | Kingston University |

This Programme Specification is designed for prospective students, current students, academic staff and employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes and content of each modules can be found in the course VLE site and in individual Module Descriptors.

**SECTION 1: GENERAL INFORMATION**

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| **Award(s) and Title(s):** | MChem (Hons) Chemistry with Medicinal Chemistry  |
| **Intermediate Awards(s) and Title(s):** | Cert HE, Dip HE, Ordinary degree, BSc (Hons) |
| **FHEQ Level for the Final Award:** | Masters (MChem) Level 7 |
| **Awarding Institution:** | Kingston University |
| **Teaching Institution:** | Kingston University |
| **Location:** | Penrhyn Road |
| **Language of Delivery:** | English |
| **Modes of Delivery:** | Full time, Part time, sandwich |
| **Available as:** | Full field |
| **Minimum period of registration:** | 4 years full time;5 years for the Professional Placement & International Exchange options;8 years part time |
| **Maximum period of registration:** | 8 years full time;9years for the Professional Placement & International Exchange options;12 years part time |
| **Entry Requirements:**  | The minimum entry qualifications for the programme are: 112, depending on qualificationsFrom A levels: A2 Chemistry minimum grade C and one other science subject (second science can be Biology, Physics or Maths) General Studies and Critical Thinking not accepted.BTEC National: Diploma/Extended Diploma in Applied Science (Chemistry) only must have merits in the following units:Unit 1: "Principles and Applications in Science 1"Unit 5: "Principles and Applications in Science 2"Unit 13: "Applications of Inorganic Chemistry"Unit 14: "Applications of Organic Chemistry" Access Diploma: We will consider a range of alternative Level 3 qualifications such as an Access Course in a relevant Science subject which has been passed with 112 UCAS points including 18 level 3 credits in Chemistry with a minimum 9 level 3 credits at Distinction and 9 Level credits at Merit.Plus:GCSE Candidates are normally required to hold five GCSE subjects grades A-C including Mathematics and English Language (or comparable numeric score under the newly reformed GCSE grading).A minimum IELTS score of 6.0 with no element below 5.5, TOEFL iBT 80 (with minimum scores R=18, L=17, S=20, W=17) or equivalent is required for those for whom English is not their first language. Entry is normally at Level 4 with A-level or equivalent qualifications (See section D). Transfer from a similar course is possible at Level 5 with passes in comparable Level 4 modules – but is at the discretion of the course team. Intake is normally in September.Through our provision of Recognition of Prior Learning, applicants may be able to receive academic credit for previously accumulated credits (for example, 120 credits gained at another institution in topics allied to those taught in this course) where it can be proven as the equivalent in level and outcome to modules / courses offered.  |
| **Programme Accredited by:** |  |
| **QAA Subject Benchmark Statements:** | All subject benchmark statements can be found [here](https://www.qaa.ac.uk/quality-code/subject-benchmark-statements). The Chemistry QAA Subject Benchmark statement can be accessed at: <https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-chemistry.pdf?sfvrsn=1af2c881_4>  |
| **Approved Variants:** | None |
| **UCAS Code:** | F123 |

**SECTION 2: THE COURSE**

1. **Aims of the Course**

The main aims of the field taken by MChem Chemistry with Medicinal Chemistry students are:

 to enable students to specialize in the field of medicinal chemistry while providing students with a broad knowledge of chemistry including applied aspects, plus depth in the main branches of the subject (organic, inorganic, physical and analytical chemistry)

 to develop subject related practical skills

 to prepare students for graduate employment (in a medicinal chemistry related role or otherwise) or further study (either taught or by research) by developing their intellectual, problem solving, analytical and key (transferable) skills.

 to enable students to develop research skills and methodologies, including project and time management, modern literature searching techniques, critical analysis of data and report presentation

 to provide students with the opportunity to study topics within medicinal chemistry that will prepare them for future roles as professional medicinal chemists in both greater breadth and depth than via a Chemistry BSc course

1. **Intended Learning Outcomes**

The course outcomes are referenced to the relevant QAA subject benchmarks indicated and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014), and relate to the typical student. The course provides opportunities for students to develop and demonstrate knowledge and understanding specific to the subject, key skills and graduate attributes in the following areas:

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| **Programme Learning Outcomes** |
|  | **Knowledge and Understanding**On completion of the course students will (depending on optional modules taken) have specific subject knowledge and understanding from: |  | **Intellectual Skills**On completion of the course students will be able to |  | **Subject Practical Skills**On completion of the course students will be able to |
| A1 | The three core branches of chemistry (inorganic, organic & physical)  | B1 | Critically analyse and appraise primary and secondary sources of information, where necessary using multiple sources of information  | C1 | Carry out preparative and analytical (both qualitative and quantitative) laboratory work in the main branches of chemistry and medicinal chemistry |
| A2 | Medicinal chemistry at an advanced level, as well as other applied areas of chemistry (such as environmental, materials and industrial) | B2 | Solve complex problems both in aspects of chemistry and the supporting numerical areas | C2 | Report on and draw conclusions from the results of laboratory work |
| A3 | Experimental & analytical chemistry, including aspects of separation science and spectroscopy | B3 | Propose, carry out and report the results of an individual research project in medicinal chemistry to a publishable level | C3 | Plan an extended programme of laboratory work and carry out a safety assessment for it |
| A4 | The numerical and computational skills necessary for working in a medicinal chemistry related discipline | B4 | Demonstrate the ability to work and study in an independent manner | C4 | Use a range of complex instrumentation and understand the technical basis for it |
| A5 | The skills and methodologies required for undertaking an original research programme |  |  |  |  |

In addition to the programme learning outcomes identified overleaf, the programme of study defined in this programme specification will allow students to develop a range of Key Skills as follows:

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| **Key Skills** |
| **Self-Awareness Skills**  | **Communication Skills**  | **Interpersonal Skills** | **Research and information Literacy Skills**  | **Numeracy Skills** | **Management & Leadership Skills**(FK) | **Creativity and Problem-Solving Skills** (GK) |
| Take responsibility for own learning and plan for and record own personal development | Express ideas clearly and unambiguously in writing and the spoken work | Work well with others in a group or team | Search for and select relevant sources of information | Collect data from primary and secondary sources and use appropriate methods to manipulate and analyse this data | Determine the scope of a task (or project) | Apply scientific and other knowledge to analyse and evaluate information and data and to find solutions to problems |
| Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback | Present, challenge and defend ideas and results effectively orally and in writing | Work flexibly and respond to change | Critically evaluate information and use it appropriately | Present and record data in appropriate formats | Identify resources needed to undertake the task (or project) and to schedule and manage the resources | Work with complex ideas and justify judgements made through effective use of evidence |
| Organise self effectively, agreeing and setting realistic targets, accessing support where appropriate and managing time to achieve targets | Actively listen and respond appropriately to ideas of others | Discuss and debate with others and make concession to reach agreement | Apply the ethical and legal requirements in both the access and use of information | Interpret and evaluate data to inform and justify arguments | Evidence ability to successfully complete and evaluate a task (or project), revising the plan where necessary |  |
| Work effectively with limited supervision in unfamiliar contexts |  | Give, accept and respond to constructive feedback | Accurately cite and reference information sources | Be aware of issues of selection, accuracy and uncertainty in the collection and analysis of data | Motivate and direct others to enable an effective contribution from all participants |  |
|  |  | Show sensitivity and respect for diverse values and beliefs | Use software and IT technology as appropriate |  |  |  |

1. **Outline Programme Structure**

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Each level is made up of four modules, each worth 30 credit points, excepting the sandwich year placement which comprises a single 120 credit module and Level 7, which consists of three modules, two of which are worth 30 credit points and the project module that is worth 60 credit points. Typically a student must complete 120 credits at each level. All students will be provided with the University regulations. Full details of each module will be provided in module descriptors.

Note: As per [GR5](https://d68b3152cf5d08c2f050-97c828cc9502c69ac5af7576c62d48d6.ssl.cf3.rackcdn.com/documents/user-upload/kingston-university-63963086086-kingston-university-gr5-changes.pdf) within the general regulations, the University aims to ensure that all option modules listed below are delivered. However, for various reasons, such as demand, the availability of option modules may vary from year to year or between teaching blocks. The University will notify students as soon as these circumstances arise by email.

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| **Level 4** (all core) |
| **Core modules** | **Module code** | **Credit** **Value** | **Level**  | **Teaching Block** |
| Foundation Organic & Physical Chemistry | CH4001 | 30 | 4 | 1&2 |
| Foundation Inorganic & Environmental Chemistry | CH4002 | 30 | 4 | 1&2 |
| Introduction to Spectroscopic & Experimental Techniques | CH4003 | 30 | 4 | 1&2 |
| Academic Skills for Molecular Science | CH4004 | 30 | 4 | 1&2 |

This course permits progression from level 4 to level 5 with 90 credits at level 4 or above. Progression to level 5 requires passes in CH4001, CH4002 and CH4003. The outstanding 30 credits from level 4 can be trailed into level 5 and must be passed before progression to level 6. In addition, students must complete at least 80% of the practical sessions.

Students exiting the course at this point who have successfully completed 120 credits at level 4 or above are eligible for the award of Certificate of Higher Education in Chemistry.

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| **Level 5 (all core)** |
| **Compulsory modules** | **Module code** | **Credit** **Value** | **Level**  | **Teaching Block** | **Pre-requisites** |
| Inorganic Chemistry | CH5001 | 30 | 5 | 1&2 | CH4002 |
| Organic & Medicinal Chemistry | CH5002 | 30 | 5 | 1&2 | CH4001 |
| Physical Chemistry | CH5003 | 30 | 5 | 1&2 | CH4001 |
| Analytical & Experimental Chemistry | CH5004 | 30 | 5 | 1&2 | CH4003 |
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| **Sandwich Placement** for students on the sandwich course |
| **Compulsory modules** | **Module code** | **Credit** **Value** | **Level**  | **Teaching Block** |
| Sandwich Year Placement | LS5000 | 120 | Sandwich Year | Minimum of 36 weeks throughout the year |

LS5000 is a core module for students who choose the sandwich year placement.

This course permits progression from level 5 to level 6 with 90 credits at level 5 or above. Progression to level 6 requires a pass in CH5004 if the option module CH6007 is chosen. The outstanding 30 credits from level 5 can be trailed into level 6 and must be passed before consideration for an award. In addition students must complete at least 80% of the practical sessions.

Students exiting the programme at this point who have successfully completed 120 credits at level 5 or above are eligible for the award of Diploma of Higher Education in Chemistry.

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| **Level 6** (90 credits core; 30 credits option modules) |
| **Core modules** | **Module code** | **Credit** **Value** | **Level**  | **Teaching Block** |  |
| Organic & Natural Product Chemistry | CH6001 | 30 | 6 | 1&2 |  |
| Project | CH6004 | 30 | 6 | 1&2 |  |
| Inorganic & Physical Chemistry | CH6013 | 30 | 6 | 1&2 |  |
| **Option modules** |  |  |  |  | **Pre-requisites** |
| Advanced Materials & Industrial Chemistry | CH6016 | 30 | 6 | 1&2 |  |
| Advanced Analytical Science | CH6007 | 30 | 6 | 1&2 | CH5004 |
| Drug Development | CH6008 | 30 | 6 | 1&2 |  |

Progression to Level 7 requires the completion of the compulsory modules and one option module.

Students exiting the programme at this point who have successfully completed 120 credits are eligible for the award of BSC (Hons) Chemistry.

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| **Level 7**  |
| **Core modules** | **Module code** | **Credit** **Value** | **Level**  | **Teaching Block** |  |
| Project | CH7001 | 60 | 7 | 1&2 |  |
| Design Discovery & Development of Pharmaceuticals | CH7070 | 30 | 7 | 1 |  |
| Medicinal Chemistry in the Pharmaceutical Industry | CH7160 | 30 | 7 | 2 |  |

Students exiting the programme with 120 credits at each level are eligible for the award of MChem.

1. **Principles of Teaching, Learning and Assessment**

Knowledge and understanding of the field is developed from level to level. Level 4 consolidates and succeeds A level Chemistry or equivalent and provides a core understanding of the main organic, inorganic and physical branches of the subject. It also furthers knowledge of laboratory techniques and analytical methods and provides breadth through introduction to environmental chemistry. Essential mathematical and computing skills are also emphasised. Level 5 extends discussion and comprehension of organic, inorganic, physical and analytical chemistry and also introduces aspects of medicinal chemistry. Level 6 of the programme allows students to pursue these same aspects to a higher level, while allowing them to gain familiarity with more applied areas of the field, for example looking at aspects of modern materials and industrial chemistry, and also enabling students to start to develop independent research skills. At level 7, the emphasis is on medicinal chemistry, which includes a significant research project in a specific area of the student’s choice. Here, they are able to carry out individual investigations (either laboratory or literature based) from initial planning to final report. Research informs much of the teaching on the course and this is particularly the case in the final year. Project supervisors frequently offer projects related to their own areas of expertise and active research, with final year project students making a contribution to these.

Teaching on this course is multi-faceted; there is a strong emphasis on student-centred learning such as project-based, enquiry-led and problem-based approaches in order to improve inclusivity within a curriculum that can be perceived as abstract and thus not egalitarian. As example of this inclusive approach is demonstrated by the group problem-based learning project where students are able to explore and investigate a major atmospheric environmental problem. The use of group work to facilitate participation is a common thread that runs through the whole course.

From level to level, students make progressively more use of primary and research-based sources of information. They develop skills to analyse and appraise original sources, assemble data from various sources, solve complex problems. Students are expected to become more independent in their learning as the course progresses and are supported in this by two research projects, where learner autonomy is championed at level 6 and the skills developed then put into place with a more in-depth practical project at level 7.

A feature of this field is the range of practical work that is undertaken using advanced equipment and instrumentation. Students become familiar (by direct hands-on experience) with infrared, ultraviolet/visible and nuclear magnetic resonance spectroscopy, mass spectrometry, various forms of chromatography and some of the so-called hyphenated techniques.

Throughout the field, emphasis is placed on group work skills, written and oral communication and presentation skills, data handling and analysis skills, a range of ICT skills and independent learning skills. This provides the basis for students to enhance their personal objectives after graduation, whether these relate to further research or training, or to careers in the pharmaceutical industry, commerce or otherwise.

The skills developed during the study of the field are assessed within these various types of assessment. For example: the use of ICT is a normal expectation in the preparation of written work, reports etc.; data handling is inherent in many of the activities; assessments are carried out by groups and individuals, and greater self-reliance is needed from level to level. Assessment is tracked via a calendar to spread workload and to avoid bunching.

E-Technology plays an important role in enhancing learning and teaching throughout the chemistry course. Canvas is a virtual learning environment (VLE) that allows students to access lecture notes, assessments, screencasts, practical videos and links to Open Educational Resources (OERs) outside of the class room. Classroom technologies such as MS Teams allow the electronic recording of work done on an electronic whiteboard in the classroom. The use of Turnitin allows students to recognise the dangers of plagiarism and Grademark and other electronic marking systems are used by staff to give students quicker and clearer feedback. A large range of modules make use on on-line assessment tools to provide formative assessment with rapid feedback to enable students to prepare better for their subsequent summative assessments. E-technology is also used in the electronic marking of some practical work and in addition, it provides a forum for peer learning through the development and use of discussion boards and can also support blended learning in, for example, the delivery of talks by external speakers through online sessions.

The assessments are a mixture of coursework and of end-of-module exams. Key pieces of coursework will be of a formative nature, allowing students to benefit and learn from feedback given on a piece of work, before completion of a similar, though summative assessment. Each module carries a final grade, which is made up of summative marks for course work and end of module assessments. The contribution of the individual elements of assessment to the module total and the requirements to pass each module are detailed in individual module guides.

Many modules in the course have an assessment component comprised of a collection of smaller coursework elements such as practical forms, laboratory forms or data collected in class and small problem assignments. Continual review of these assessment elements is performed to ensure that students get feedback on one piece before doing the next and that the summative assessment burden is not so great to prevent students being engaged with the formative assessment opportunities offered in modules. Many laboratory proforma can be completed during the laboratory sessions themselves using the computer facilities available, and immediate feedback obtained via automated electronic worksheets.

All students are allocated a personal tutor during the induction week preceding the first year of the course. They are encouraged to make contact with this staff member, who will remain an important figure in their four years at Kingston University, during the induction week – perhaps informally at the Freshers’ Party, or by appointment later in the week before teaching starts. Having regular contact with a staff member who is able to get to know them personally is of great advantage to the student. Not only does it give them someone to consult for advice on academic and sometime non-academic matters, but it provides them with someone who is well informed to write a reference for them, either for placements or summer internships, or at towards the end of their course as they embark on the next stages of their careers.

In the first year, in addition to subject-specific material, key academic and professional skills are introduced, such as critical thinking, literature searching and the production of career development documentation (such as a CV and cover letter). This is followed up in the second semester with a review of academic progress. In the second year, attention turns more to employability, including an emphasis on subject-specific employability and reflection on soft skills. These skills are introduced by a brief re-induction session preceding the start of the second year and are assisted by employability coordinators from the Careers and Employability Service. Prior to the penultimate and final years, re-induction sessions focus more on the project work to be carried out each year, while contact with personal tutors again focusses on employability and preparation for life as a medicinal chemistry graduate, after completion of the course.

1. **Support for Students and their Learning**

Students are supported by:

* A Course Leader, to help students understand the overall course structure
* A Module Leader for each module taken
* A Personal Tutor to provide academic and personal support (as part of the Personal Tutor Scheme)
* Technical support to advise students on IT and the use of software
* An induction programme at the start of each new academic session
* A Student Voice Committee
* My Kingston/Canvas – an on-line interactive intranet and virtual learning environment
* Student Services, which provides support facilities that are able to give advice on matters such as finance, regulations, legal issues, accommodation, personal issues, disability, international student support.
* The Union of Kingston Students
* Careers and Employability Service
* The Library, which includes the four on campus libraries as well as an online library and other e-resources
* The Academic Success Centre (ASC) and MathsAid, that provide specific academic support on academic writing, study skills and maths
1. **Ensuring and Enhancing the Quality of the Course**

The University has several methods for evaluating and improving the quality and standards of its provision. These include:

* External examiners
* Boards of study with student representation
* Annual Monitoring and Enhancement
* Periodic review undertaken at subject level
* The Industrial Advisory Board for the Department of Chemical and Pharmaceutical Sciences
* Student evaluation including Module Evaluation Questionnaire (MEQs), level surveys and the National Student Survey (NSS)
* Moderation policies
* Feedback from employers
1. **Employability and work-based learning**

The course is designed to prepare students for employment in the pharmaceutical and chemical industries by providing them with the core knowledge and skills expected of a graduate (medicinal) chemist. Representatives from a range of employers were consulted while the course was being designed and their feedback was taken into account. The school has strong links with the chemical industry and students are encouraged to apply for professional placements (or alternatively, 3-month summer internships) where possible. Some of these placements lead to offers of employment once the student has successfully completed the course. A number of more local employers come into the school to give presentations about their companies and the opportunities in them (for example, Procter & Gamble and GlaxoSmithKline).

In addition to developing discipline specific employability skills, the course is designed with generic employability skills embedded.  In the second year students are required to explore possible career paths open to chemistry graduates. They have to prepare a group presentation on one path and attend presentations on a variety of career paths given by other groups of students.  This level 5 module and the level 6 & 7 research project modules build on work done in the personal tutor system, and the academic skills module, to make students reflect on and develop the attributes that employers seek in graduates. These include independent learning, the ability to work in teams, time management skills, verbal and written communication skills. A number of these skills are also developed through group work and presentations in other modules. One role of the Personal Tutor system is to encourage students to develop such skills through volunteering, sports activities, positions of responsibility in clubs and societies, student ambassador schemes and study abroad.

Studying abroad is actively encouraged via the promotion of the degree with international exchange. This allows students to spend an entire year abroad after their second year. It counts as only one 60 credit module (“international exchange”) which is pass or fail. The modules studied abroad do not replace any Kingston modules.  The European and Study Abroad office in the international office helps students find a suitable institution abroad. This route gives students the chance to study a broader curriculum and obtain a deeper understanding of their discipline. International exchange provides a valuable opportunity for students to broaden their experience and develop transferable skills. The international perspective they gain from their year abroad should be highly valued by global employers in the chemical Industry.

In recent years, graduates from the school have taken employment with a number of large, multinational companies including Procter & Gamble and GlaxoSmithKline. Others are employed by SMEs including Medpharm and BodycoteProva, while others enter public sector organizations including the NHS and the Laboratory of the Government Chemist. About 25% each year go on to postgraduate study, including the PGCE, leading to teaching careers.

***Work-based learning, including sandwich courses and higher or degree apprenticeships***

Work placements are actively encouraged; although it is the responsibility of individual students to source and secure such placements, there is support from the Careers and Employability Service as well as from individual members of staff. This allows students to reflect upon their own personal experience of working in an applied setting, to focus on aspects of this experience that they can clearly relate to theoretical concepts and to evaluate the relationship between theory and practice.

1. **Other sources of information that you may wish to consult**

Royal Society of Chemistry: <http://www.rsc.org/>

Advance HE: <https://www.advance-he.ac.uk/>

1. **Development of Course Learning Outcomes in Modules**

This table maps where course learning outcomes are **summatively** assessed across the modules for this course. It provides an aid to academic staff in understanding how individual modules contribute to the course aims, a means to help students monitor their own learning, personal and professional development as the course progresses and a checklist for quality assurance purposes.

|  |  |  | **Level 4** | **Level 5** |  |  | **Level 6** | **Level 7** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Module Code** |  | **CH4001** | **CH4002** | **CH4003** | **CH4004** | **CH5001** | **CH5002** | **CH5003** | **CH5004** | **CH6001** | **CH6004** | **CH6016** | **CH6007** | **CH6008** | **CH6013** | **CH7001** | **CH7070** | **CH7160** |
| **Programme Learning Outcomes** | **Knowledge & Understanding** | A1 | Y | Y | Y |  | Y | Y | Y |  | Y | Y | Y | Y |  | Y | Y | Y | Y |
| A2 |  | Y | Y |  |  | Y |  | Y | Y | Y | Y |  | Y |  | Y | Y | Y |
| A3 | Y |  |  |  | Y |  | Y | Y | Y | Y | Y |  |  | Y | Y | Y | Y |
| A4 | Y |  |  | Y |  | Y | Y | Y | Y |  | Y |  |  | Y |  | Y | Y |
| A5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Y | Y | Y |
| **Intellectual Skills** | B1 |  | Y |  | Y |  |  | Y |  | Y | Y | Y | Y | Y | Y | Y |  | Y |
| B2 | Y |  |  | Y | Y | Y | Y | Y | Y | Y | Y |  | Y | Y | Y |  |  |
| B3 |  |  | Y |  | Y |  |  | Y | Y | Y |  |  |  | Y | Y | Y | Y |
| B4 |  |  |  | Y |  | Y | Y | Y |  | Y |  | Y |  |  | Y |  | Y |
| **Practical Skills** | C1 | Y | Y | Y |  |  | Y | Y | Y | Y | Y | Y |  | Y | Y | Y | Y | Y |
| C2 | Y | Y | Y |  | Y | Y | Y | Y | Y |  | Y | Y | Y | Y | Y | Y | Y |
| C3 |  |  | Y |  |  |  |  | Y |  | Y |  |  |  |  | Y | Y | Y |
| C4 |  |  | Y |  |  | Y | Y | Y |  | Y |  |  |  |  | Y | Y | Y |

**Students will be provided with formative assessment opportunities throughout the course to practise and develop their proficiency in the range of assessment methods utilised.**