

# BSC (HONS) CHEMICAL PHYSICS

## Overview

NFQ Level 8, Major Award

## Eligibility

Students from the Chemical Sciences (<https://ucc-ie-public.courseleaf.com/programmes/bcccm/>) and Physics and Astrophysics (<https://ucc-ie-public.courseleaf.com/programmes/bscpy/>) Area of Study (entry CK406 and CK408 respectively) who pass First Science may opt to enter this programme. There are ten places available each year.

## Quotas

Students who opt to enter will be offered places in order of merit based on their average mark across compulsory modules in Physics (PY1052 and PY1053) and Chemistry (CM1200 Fundamentals of Modern Chemistry Part 1 and CM1201 in CK406; CM1006 or CM1007 in CK408) in the First Year Examination. In filling the quotas, places will be given to students passing the First University Examination in Science in the first year of registration. Remaining places, if any, will be filled in order of merit without distinction as to when the examination was completed. The decision as to the filling of such remaining places will be made after the results of the Autumn Supplemental Examination are known.

## Second Year - Chemical Physics

In Second Science, students take modules from the Second Science degree programmes in Physics and Chemistry encompassing basic Quantum Physics, Thermal Physics and Electromagnetism, as well as fundamental Physical Chemistry. Two other modules are taken from the Mathematical Sciences.

## Third Year - Chemical Physics

In Third Science, students take modules from the Third Science degree programmes in Physics and Chemistry encompassing advanced quantum physics, statistical physics and electromagnetism, as well as advanced physical chemistry and spectroscopy. Two other modules are taken from the Mathematical Sciences in modelling subjects.

## BSc Ordinary Degree - NFQ Level 7, Major Award

Students who pass Third Year may choose not to proceed to Fourth Year and may opt instead to be conferred with a BSc Ordinary Degree (<https://ucc-ie-public.courseleaf.com/programmes/bscpas/>).

## Fourth Year - Chemical Physics

In Fourth Year, students take 50 credits of core modules. A further 10 credits are chosen from the list of elective Physics modules.

## Programme Requirements

For information about modules, module choice, options and credit weightings, please go to Programme Requirements (p. 1).

## Programme Requirements

Code	Title	Credits
<b>Year 1</b>		
Students take 60 credits as follows:		60
CK406	( <a href="https://ucc-ie-public.courseleaf.com/programmes/bcccm/">https://ucc-ie-public.courseleaf.com/programmes/bcccm/</a> )	

or		
CK408 ( <a href="https://ucc-ie-public.courseleaf.com/programmes/bscpy/">https://ucc-ie-public.courseleaf.com/programmes/bscpy/</a> )		
<b>Year 2</b>		
Students take 60 credits as follows:		
<i>Core Modules</i>		
<i>Chemistry</i>		
CM2001	Main Group and Transition Element Chemistry	5
CM2003	Energetics and Kinetics	5
CM2004	States of Matter <sup>1</sup>	5
or CM2101	Introductory Organic Chemistry for Environmental Scientists	
CM2007	Spectroscopy	5
CM2008	Structure, Bonding and Quantum Mechanics	5
<i>Physics</i>		
PY2102	Introduction to Quantum Physics	5
PY2103	Electrostatics and Magnetostatics	5
PY2104	Introduction to Thermodynamics and Statistical Physics	5
PY2105	Introduction to Computational Physics	5
PY2108	Experimental Methods I	5
<i>Applied Mathematics</i>		
AM2071	Fourier Methods	5
<i>Mathematics</i>		
MA2071	Multivariable Calculus	5
<b>Year 3</b>		
Students take 60 credits as follows:		
<i>Core Modules</i>		
<i>Chemistry</i>		
CM3016	Molecules and Radiation	5
CM3017	Reaction Kinetics and Electrochemistry	5
CM3025	Materials Chemistry	5
CM3028	Scientific Communication and Information Literacy Skills	5
CM3104	Environmental Chemistry and Analysis	5
<i>Physics</i>		
PY3101	Optics	5
PY3102	Quantum Mechanics	5
PY3103	Electromagnetism	5
PY3105	Introduction to Condensed Matter Physics	5
PY3108	Experimental Methods II	5
<i>Applied Mathematics</i>		
AM2060	Object Oriented Programming with Applications	5
<i>Mathematics</i>		
AM2061	Computer Modelling and Numerical Techniques	5
<b>Year 4</b>		
Students take 60 credits as follows – all listed core modules (50 credits) and 10 credits of elective modules:		
<i>Core Modules</i>		
<i>Chemical Physics</i>		
CY4002	Advanced Chemistry Research Project	10
CY4003	Advanced Physics Research Project	10
<i>Chemistry</i>		
CM4019	Lasers, Photochemistry & Spectroscopy	5

CM4020	Interfaces & Modelling	5
CM4025	Advanced Nano Materials	5
CM4112	Atmospheric Chemistry and Air Pollution	5
<i>Physics</i>		
PY4105	Atomic and Molecular Physics	5
PY4109	Advanced Computational Physics	5
<i>Elective Modules</i>		
Students take modules to the value of <b>10</b> credits from the following:		10
PY4102	Advanced Quantum Mechanics ()	
PY4103	Advanced Electromagnetism ()	
PY4104	Advanced Condensed Matter Physics ()	
PY4108	Introduction to Lasers and Photonics ()	
PY4118	Physics of Semiconductor Devices ()	
<b>Total Credits</b>		<b>240</b>

<sup>1</sup> Students who took CM1007 or CM1201 in First Science must take CM2004. Students who took CM1006 in First Science must take CM2101.

## Examinations

Full details and regulations governing Examinations for each programme will be contained in the *Marks and Standards Book* and for each module in the *Book of Modules*.

## Programme Learning Outcomes

**Programme Learning Outcomes for BSc in Chemical Physics (NFQ Level 8, Major Award)**

On successful completion of this programme, students should be able to:

- Identify, formulate, analyse and solve chemistry and physics problems;
- Apply the major theories of physics to fundamental aspects of chemistry;
- Design an experiment to test a hypothesis or theory in chemistry and physics;
- Prepare written laboratory reports that provide a description of the experiment, explain the experiment and reasoning clearly, and provide an appropriate conclusion;
- Communicate effectively with the chemistry and physics communities.