BED (HONS) SCIENCE EDUCATION - CK413

Overview

NFQ Level 8, Major Award

Course Outline

This full-time degree programme is of four years duration and enables you to become a fully qualified science teacher of two specialist subjects within these four years. Training takes place in UCC's state-of-the-art Eureka Centre for Inquiry-Based Education in Science and Mathematics and also in the science laboratories of the College of Science, Engineering and Food Science.

The course is designed to ensure that it is compliant with all requirements of the Teaching Council as specified in the relevant Teaching Council documentation: https://www.teachingcouncil.ie/en/news-events/latest-news/curricular-subject-requirements.pdf

On completion of the programme you will be fully qualified to teach your two specialist subjects to Leaving Certificate standard. The total number of credits studied in each subject area over the four years of the programme is summarised in the following table:

Science Subject 1	Science Subject 2	Education	Total
60 credits	60 credits	120 credits (inclusive of 60 credits of School Placement)	240 credits

On entering the programme, students choose one of the following five routes:

Route 1: Biology + Chemistry

Route 2: Physics + Mathematics

Route 3: Computer Science + Mathematics

Route 4: Chemistry + Mathematics

Route 5: Computer Science + Chemistry

In Year 1 all students study **10** credits of Education and a total of **50** credits of their two specialist subjects. In this year you will study the foundations of your two specialist science subjects and will receive an introduction to science teaching and science education.

In Year 2 all students study **20** credits of their first specialist science subject, **20** credits of their second specialist subject and **20** credits of Education. You will study your two specialist subjects in more details and will spend some time on School Placement (minimum of 3 hours per week over 10 weeks) in a local secondary school. Your School Placement will be fitted in around your UCC lectures and laboratory practical sessions.

In Year 3 all students study 30 credits of Education and a total of 30 credits of their specialist science subjects. You will continue studying your two specialist subjects in more details and will spend some time on School Placement (minimum of 3 hours per week over 10 weeks) in a local secondary school. Your School Placement will be fitted in around your UCC lectures and laboratory practical sessions.

In Year 4, all modules are education modules, with increased time spent on School Placement (minimum of 4 hours per week from August to May) and also time spent at lectures and laboratory practical sessions at UCC.

Course Practicalities

Year 1: A mixture of lectures, laboratory practical sessions, seminars and microteaching sessions.

Years 2, 3, & 4: A mixture of lectures, laboratory practical sessions, and School Placement in local secondary schools. Your workload will consist of studying lecture notes, writing up practical laboratory notes, and preparing lesson plans for the lessons that you teach in school. Your School Placement is fitted in around your normal lectures in UCC.

Assessment

Written exams take place before Christmas and in May. Not all modules will have formal examinations. Many modules use other types of assessment. In Year 1, the assessment methods consist mainly of written examinations and continuous assessment of laboratory practical work. In years 2 and 3, the assessment consists of written examinations, continuous assessment of laboratory practical work, and School Placement. Your School Placement will be supervised by a member of staff of UCC's School of Education. In year 4, the entire year is assessed mainly by means of continuous assessment involving project work, laboratory practical work, and supervision of School Placement.

Who teaches this course

Teaching is carried out by staff drawn from the following:

School of Education

Department of Physics

School of Biochemistry and Cell Biology

School of Biological, Earth and Environmental Science (BEES)

School of Chemistry

School of Computer Science and Information Technology

School of Mathematical Sciences

School of Microbiology

Programme Requirements

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

Programme Requirements

Code	Title	Credits
Year 1		**60**
Students take modules to the value of **60** credits in **one** of the following routes:		
Route 1 (Biology and Chemistry)		
Students take **60** credits as follows:		
Core Modules		
Biology		
BC1001	Introduction to Biochemistry and the Biological Basis of Disease (5)	

BL1002	Cells, Biomolecules, Genetics and Evolution (5)
BL1004	Physiology and Structure of Plants and Animals (5)
BL1006	Habitats and Ecosystems (5)
MB1003	Microbiology in Society (5)
Chemistry	
CM1200	Fundamentals of Modern Chemistry Part 1 (10)
CM1201	Fundamentals of Modern Chemistry Part 2a (10)
CM1203	Teaching Chemistry Concepts (5)
Education	
ED1101	Introduction to Science Education (5)
ED1102	Introductory Teaching Practice Placement Science Education (5)

Route 2 (Physics and Mathematics) [1]

Students take **60** credits as follows:

Core Modules

Physics	
PY1052	Introductory Physics I (10)
PY1053	Introductory Physics II (10)
Mathematics	
AM1052	Introduction to Mechanics (5)
AM1053	Introduction to Mathematical Modelling (5)
MA1058	Introduction to Linear Algebra (5)
MA1059	Calculus (5)
MS2013	Geometry (5)
ST1051	Introduction to Probability and Statistics (5)
Education	
ED1101	Introduction to Science Education (5)
ED1102	Introductory Teaching Practice Placement Science Education (5)

Route 3 (Computer Science and Mathematics) [1]

Students take **60** credits as follows:

Core Modules

Computer Science	
CS1022	Introduction to Programming and Problem Solving (15)
CS1115	Web Development 1 (5)
Mathematics	
AM1052	Introduction to Mechanics (5)
AM1053	Introduction to Mathematical Modelling (5)
MA1058	Introduction to Linear Algebra (5)
MA1059	Calculus (5)
MS2013	Geometry (5)
ST1051	Introduction to Probability and Statistics (5)
Education	
ED1101	Introduction to Science Education (5)
ED1102	Introductory Teaching Practice Placement Science Education (5)

Route 4 (Chemistry and Mathematics) [1]

Students take **60** credits as follows:

Core Modules

Chemistry	
CM1200	Fundamentals of Modern Chemistry Part 1 (10)
CM1201	Fundamentals of Modern Chemistry Part 2a (10)
CM1203	Teaching Chemistry Concepts (5)
Mathematics	
AM1052	Introduction to Mechanics (5)
MA1058	Introduction to Linear Algebra (5)
MA1059	Calculus (5)
MS2013	Geometry (5)
ST1051	Introduction to Probability and Statistics (5)
Education	
ED1101	Introduction to Science Education (5)
ED1102	Introductory Teaching Practice Placement Science Education (5)

Route 5 (Computer Science and Chemistry)

Students take **60** credits as follows:

Core Modules

Computer Science	
CS1022	Introduction to Programming and Problem Solving (15)
CS1115	Web Development 1 (5)
CS1021	Relational Databases I (5)
Chemistry	
CM1200	Fundamentals of Modern Chemistry Part 1 (10)
CM1201	Fundamentals of Modern Chemistry Part 2a (10)
CM1203	Teaching Chemistry Concepts (5)
Education	
ED1101	Introduction to Science Education (5)
ED1102	Introductory Teaching Practice Placement Science Education (5)

Year 2 **60**

Students take modules to the value of **60** credits in **one** of the following routes:

Route 1 (Biology and Chemistry)

Students take **60** credits as follows:

Core Modules

Biology	
AE2001	Fundamentals of Ecology (5)
MB2905	Fundamentals of Microbiology (5)
ML2001	Introductory Molecular Biology (5)
PS2001	Introduction to Plant Biotechnology (5)
Chemistry	
CM2001	Main Group and Transition Element Chemistry (5)
CM2002	Fundamentals of Organic Chemistry (5)
CM2005	Structures and Reactions of Main Group Compounds (5)
CM2008	Structure, Bonding and Quantum Mechanics (5)
Education	
ED2103	(10)
ED2104	(10)

Route 2 (Physics and Mathematics)

Students take **60** credits as follows:

Core Modules

Physics	
PY2101	Classical Mechanics (5)

PY2102	Introduction to Quantum Physics (5)
PY2103	Electrostatics and Magnetostatics (5)
PY2108	Experimental Methods I (5)
Mathematics	
AM2071	Fourier Methods (5)
MA2071	Multivariable Calculus (5)
MS2005	Discrete Mathematics (5)
MS2014	Algebraic Methods and Applications (5)
Education	
ED2103	(10)
ED2104	(10)

Route 3 (Computer Science and Mathematics)

Students take **60** credits as follows:

Core Modules

Computer Science	
CS1110	Computer Hardware Organization (5)
CS1111	Systems Organisation (5)
CS2214	Multimedia (5)
CS5007	Computer Applications Programming (5)
Mathematics	
AM2071	Fourier Methods (5)
MA2071	Multivariable Calculus (5)
MS2005	Discrete Mathematics (5)
MS2014	Algebraic Methods and Applications (5)
Education	
ED2103	(10)
ED2104	(10)

Route 4 (Chemistry and Mathematics)

Students take **60** credits as follows:

Core Modules

Chemistry	
CM2001	Main Group and Transition Element Chemistry (5)
CM2002	Fundamentals of Organic Chemistry (5)
CM2005	Structures and Reactions of Main Group Compounds (5)
CM2008	Structure, Bonding and Quantum Mechanics (5)
Mathematics	
AM2071	Fourier Methods (5)
MA2071	Multivariable Calculus (5)
MS2005	Discrete Mathematics (5)
MS2014	Algebraic Methods and Applications (5)
Education	
ED2103	(10)
ED2104	(10)

Route 5 (Computer Science and Chemistry)

Students take **60** credits as follows:

Core Modules

Computer Science	
CS1110	Computer Hardware Organization (5)
CS1111	Systems Organisation (5)
CS2214	Multimedia (5)
CS5007	Computer Applications Programming (5)
Chemistry	
CM2001	Main Group and Transition Element Chemistry (5)
CM2002	Fundamentals of Organic Chemistry (5)
CM2005	Structures and Reactions of Main Group Compounds (5)
CM2008	Structure, Bonding and Quantum Mechanics (5)
Education	
ED2103	(10)
ED2104	(10)

Year 3 **60**

Students take modules to the value of **60** credits in **one** of the following routes:

Route 1 (Biology and Chemistry)

Students take **60** credits as follows:

Core Modules

Biology	
BL2001	Plant and Animal Genetics (5)
BC2001	Biomolecules (5)
ZY2000	Vertebrate Diversity (5)
Chemistry	
CM2003	Energetics and Kinetics (5)
CM2004	States of Matter (5)
CM2007	Spectroscopy (5)
Education	
ED3101	Science Education II (15)
ED3102	Teaching Practice Placement Science Education II (15)

Route 2 (Physics and Mathematics)

Students take **60** credits as follows:

Core Modules

Physics	
PY2107	Experimental Physics I (5)
PY3101	Optics (5)
PY3103	Electromagnetism (5)
PY3107	Experimental Physics II (5)
Mathematics	
AM3051	Vector and Tensor Methods (5)

Plus **one** module from the following:

MS3001	Introduction to Abstract Algebra (5)
MS3016	Introduction to Analysis and Metric Spaces (5)
MS3017	Vector Spaces and Linear Algebra (5)
MA4403	Discrete Time Financial Models (5)
MS3020	Linear Predictive Modelling (5)
MS3021	Computational Data Analytics (5)
MS3022	Operations Research (5)
MS3023	Stochastic Decision Science (5)
Education	
ED3101	Science Education II (15)
ED3102	Teaching Practice Placement Science Education II (15)

Route 3 (Computer Science and Mathematics)

Students take **60** credits as follows:

Core Modules

Computer Science	
CS3500	Software Engineering (5)
Plus **three** modules from the following:	
CS1021	Relational Databases I (5)
CS1116	Web Development 2 (5)
CS1069	Introduction to Internet Technologies (5)
CS2213	Data Analytics for Digital Humanities I (5)
CS2517	Multimedia 2 (5)
CS3062	Computing in Society (5)
Mathematics	
AM3051	Vector and Tensor Methods (5)
Plus **one** module from the following:	
MS3001	Introduction to Abstract Algebra (5)
MS3016	Introduction to Analysis and Metric Spaces (5)
MS3017	Vector Spaces and Linear Algebra (5)
MA4403	Discrete Time Financial Models (5)
MS3020	Linear Predictive Modelling (5)
MS3021	Computational Data Analytics (5)
MS3022	Operations Research (5)
MS3023	Stochastic Decision Science (5)
Education	
ED3101	Science Education II (15)
ED3102	Teaching Practice Placement Science Education II (15)

Route 4 (Chemistry and Mathematics)

Students take **60** credits as follows:	
Core Modules	
Chemistry	
CM2003	Energetics and Kinetics (5)
CM2004	States of Matter (5)
CM2007	Spectroscopy (5)
Mathematics	
AM3051	Vector and Tensor Methods (5)
MS2022	Mathematical Modelling ()
Plus **one** module from the following:	
MS3001	Introduction to Abstract Algebra (5)
MS3016	Introduction to Analysis and Metric Spaces (5)
MS3017	Vector Spaces and Linear Algebra (5)
MA4403	Discrete Time Financial Models (5)
MS3020	Linear Predictive Modelling (5)
MS3021	Computational Data Analytics (5)
MS3022	Operations Research (5)
MS3023	Stochastic Decision Science (5)
Education	
ED3101	Science Education II (15)
ED3102	Teaching Practice Placement Science Education II (15)

Route 5 (Computer Science and Chemistry)

Students take **60** credits as follows:	
Core Modules	
Computer Science	
CS3500	Software Engineering (5)
Plus **two** modules from the following:	
CS1069	Introduction to Internet Technologies (5)
CS1116	Web Development 2 (5)
CS2213	Data Analytics for Digital Humanities I (5)
CS2517	Multimedia 2 (5)
CS3062	Computing in Society (5)
Chemistry	
CM2003	Energetics and Kinetics (5)
CM2004	States of Matter (5)
CM2007	Spectroscopy (5)
Education	
ED3101	Science Education II (15)
ED3102	Teaching Practice Placement Science Education II (15)
Year 4	**60**
Students take modules to the value of **60** credits in **one** of the following routes:	

Route 1 (Biology and Chemistry)

Students take **60** credits as follows:	
Core Modules	
Education	
ED4101	Science Education III (10)
ED4102	Teaching Practice Placement Science Education III (20)
ED4103	Conceptual Foundations in School Placement Research Portfolio A (5)
ED4104	Conceptual Foundations in the Philosophy and History of Education (5)
ED4105	Conceptual Foundations in the Psychology and Sociology of Education (5)
ED4106	Conceptual Foundations in Curriculum and Assessment (5)
ED4107	Conceptual Foundations in Inclusive Education (5)
ED4108	Conceptual Foundations in School Placement Research Portfolio B (5)

Route 2 (Physics and Mathematics)

Students take **60** credits as follows:	
Core Modules	
Education	
ED4101	Science Education III (10)
ED4102	Teaching Practice Placement Science Education III (20)
ED4103	Conceptual Foundations in School Placement Research Portfolio A (5)
ED4104	Conceptual Foundations in the Philosophy and History of Education (5)
ED4105	Conceptual Foundations in the Psychology and Sociology of Education (5)
ED4106	Conceptual Foundations in Curriculum and Assessment (5)
ED4107	Conceptual Foundations in Inclusive Education (5)
ED4108	Conceptual Foundations in School Placement Research Portfolio B (5)

Route 3 (Computer Science and Mathematics)

Students take **60** credits as follows:	
Core Modules	
Education	
ED4101	Science Education III (10)
ED4102	Teaching Practice Placement Science Education III (20)
ED4103	Conceptual Foundations in School Placement Research Portfolio A (5)
ED4104	Conceptual Foundations in the Philosophy and History of Education (5)
ED4105	Conceptual Foundations in the Psychology and Sociology of Education (5)
ED4106	Conceptual Foundations in Curriculum and Assessment (5)
ED4107	Conceptual Foundations in Inclusive Education (5)
ED4108	Conceptual Foundations in School Placement Research Portfolio B (5)
Route 4 (Chemistry and Mathematics)	
Students take **60** credits as follows:	
Core Modules	
Education	
ED4101	Science Education III (10)
ED4102	Teaching Practice Placement Science Education III (20)
ED4103	Conceptual Foundations in School Placement Research Portfolio A (5)
ED4104	Conceptual Foundations in the Philosophy and History of Education (5)
ED4105	Conceptual Foundations in the Psychology and Sociology of Education (5)
ED4106	Conceptual Foundations in Curriculum and Assessment (5)
ED4107	Conceptual Foundations in Inclusive Education (5)
ED4108	Conceptual Foundations in School Placement Research Portfolio B (5)
Route 5 (Computer Science and Chemistry)	
Students take **60** credits as follows:	
Core Modules	
Education	
ED4101	Science Education III (10)
ED4102	Teaching Practice Placement Science Education III (20)
ED4103	Conceptual Foundations in School Placement Research Portfolio A (5)
ED4104	Conceptual Foundations in the Philosophy and History of Education (5)
ED4105	Conceptual Foundations in the Psychology and Sociology of Education (5)
ED4106	Conceptual Foundations in Curriculum and Assessment (5)
ED4107	Conceptual Foundations in Inclusive Education (5)
ED4108	Conceptual Foundations in School Placement Research Portfolio B (5)
Total Credits	**240**

[1] Students must have a minimum grade of H3 in Leaving Certificate Mathematics to enter this route.

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 BEd (Hons) Science Education (NFQ Level 8, Major Award)

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

- Identify the key characteristics of excellent teaching in science as related to subject knowledge and pedagogy and engage in research of these areas.
- Apply the scientific knowledge and pedagogical skills gained in the programme to prepare lesson plans and schemes of work of the highest standard.
- Recognise and apply the basic principles of managing a learning environment.
- Develop comprehensive portfolios of teaching, learning and assessment that are relevant to the science curricula in schools.
- Evaluate the various theories of Teaching and Learning and apply these theories to assist in the creation of effective and inspiring science lessons.
- Critically evaluate the effectiveness of their teaching of science subjects in the second-level school system.
- Display a willingness to co-operate with members of the teaching staff in their assigned school.
- Foster an interest in science and a sense of enthusiasm for science subjects in their pupils.
- Synthesise the key components of laboratory organisation and management and perform laboratory work in a safe and efficient manner.
- Communicate effectively with the school community and with society at large in the area of science education.