

Final Report of the Review Panel to the Teaching Council following a review of reconceptualised Initial Teacher Education programmes at Dublin City University.

- **Bachelor of Science in Physical Education with Biology**
- **Bachelor of Science in Physical Education with Mathematics**
- **Bachelor of Science in Science Education**

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1. Background

1.1 The Teaching Council's review and accreditation function

The Teaching Council is the statutory body charged with setting the standards for entry to the teaching profession and ensuring that these standards are upheld.

In accordance with Section 38 of the Teaching Council Act, 2001, the Council shall:

- (a) review and accredit the programmes of teacher education and training provided by institutions of higher education and training in the State,
- (b) review the standards of education and training appropriate to a person entering a programme of teacher education and training, and
- (c) review the standards of knowledge, skill and competence required for the practice of teaching,

and shall advise the Minister and, as it considers appropriate, the institutions concerned.

The Teaching Council's role in relation to the review and accreditation of programmes of Initial Teacher Education (ITE) is distinct from the academic accreditation which programmes also undergo. Academic accreditation is based on the suitability of a programme for the award of a degree/diploma, whereas professional accreditation for any profession is a judgement as to whether a programme prepares one for entry into that profession.

The review and accreditation of programmes of ITE by the Teaching Council provides an opportunity for Higher Education Institutions (HEIs) to demonstrate that they offer quality programmes of teacher education. It is expected that the graduates of such programmes will achieve programme aims and learning outcomes which are aligned with the values, professional dispositions, and the standards of teaching, knowledge, skill and competence that are central to the practice of teaching.

1.2 Review and accreditation strategy

In order to guide its review of programmes, the Teaching Council has published *Initial Teacher Education: Strategy for the Review and Accreditation of Programmes* (hereinafter referred to as the Council's review strategy). That document sets out the process by which programmes are reviewed.

1.3 National policy framework

In carrying out reviews, the Council is mindful of its *Policy on the Continuum of Teacher Education* which sets out its vision for teacher education at all stages of the continuum – ITE, Induction, and Continuing Professional Development. Published in 2011, the policy highlights the evolving and dynamic context for teaching and the increasingly complex role of teachers in Ireland today. The policy states that "...the time

is now right for a thorough and fresh look at teacher education to ensure that tomorrow's teachers are competent to meet the challenges that they face and are life-long learners, continually adapting over the course of their careers to enable them to support their students' learning." It further states that innovation, integration and improvement should underpin all stages of the continuum.

In parallel with the development by the Council of its Policy on the Continuum of Teacher Education, the Minister for Education and Skills initiated a national consultation process on the theme of improving literacy and numeracy. This culminated in 2011 with the publication of Literacy and Numeracy for Learning and Life as the national strategy to improve literacy and numeracy standards among children and young people in the education system. The strategy emphasised teachers' professional development and proposed that the duration of initial teacher education (ITE) programmes should be extended and that programme content should be reconceptualised.

1.4 Accreditation criteria

The Teaching Council, having established an Advisory Group on Initial Teacher Education, developed criteria to be observed and guidelines to be followed by providers in reconceptualising programmes of initial teacher education at primary and post-primary levels. They were approved by the Council and published in June 2011 as *Initial Teacher Education: Criteria and Guidelines for Programme Providers* (hereinafter referred to as the Council's criteria). These relate to a range of areas, including programme design, areas of study, the duration of programmes, the numbers and qualifications of staff, facilities and resources. As such, they form the bridge between the Council's policy and the development and implementation of reconceptualised programmes. Significantly, the criteria:

- prescribe those areas of study which will be mandatory in programmes, including numeracy and literacy, behaviour management, parents in education, ICT and inclusive education
- set out for the first time the expected learning outcomes for graduates of all ITE programmes
- propose raising the minimum requirements for persons entering programmes of ITE at primary level and a literacy and numeracy admissions test for mature entrants
- require a 15:1 student-staff ratio
- call for the development of new and innovative school placement models, involving active collaboration between HEIs and schools, and an enhanced role for the teaching profession in the provision of structured support for student teachers
- require that student teachers should spend at least 25% of the programme on school placement, and that such placements should be in a minimum of two schools
- require increased emphasis on research, portfolio work and other strategic priorities.

While recognising the inter-related nature of all aspects of programmes of teacher education, the criteria and guidelines are categorised under Inputs, Processes and Outcomes. All three dimensions have an important bearing on the quality of teacher education. The required Inputs and Outcomes are clearly elaborated in the document, while the Processes are less prescriptive to allow HEIs the freedom to develop the processes which best suit their individual situations.

Providers of existing programmes have been asked to reconceptualise their programmes in line with the revised criteria and to submit them for accreditation. .

1.5 Particular requirements for post-primary programmes

In November 2011, the Council published *Teaching Council Requirements for Entry on to a Programme of Initial Teacher Education*, that set out the Council's revised subject criteria in draft form. Following a wide ranging consultation process involving all the major education stakeholders, a final set of proposals were developed. These were approved by Council in December 2012, and the Minister for Education and Skills has conveyed his agreement with the Council's views in this area. They have guided providers of post-primary concurrent programmes in determining the subject content coverage which is appropriate. They also guide providers of post-primary consecutive programmes in determining suitability of entrants and which curricular subjects entrants can ultimately be registered to teach. They will also guide PME providers in matching students appropriately to methodology modules.

1.6 Programme overview

This report relates to the review of the following programme (s) provided by Dublin City University (hereinafter referred to as 'DCU'):

1. The **BSc in Physical Education with Biology**, also referred to as '**PEB**' in this report. This is a 282.5 ECTS credit programme offered over four years, which prepares student teachers to teach physical education with biology as well as Junior Certificate science.
2. The **BSc in Physical Education with Mathematics**, also referred to as '**PEM**' in this report. This is a 265 ECTS credit programme offered over four years, which prepares student teachers to teach physical education with mathematics.
3. The **BSc in Science Education**. This is a 280 ECTS credit programme offered over four years, which prepares student teachers to teach one of the following two-subject combinations, depending on which specialisms they choose, and Junior Certificate science:
 - Chemistry and mathematics
 - Mathematics and physics
 - Physics and chemistry.

All three programmes set out above will be hereinafter referred to collectively as 'the programmes'.

2. *The Review Process*

The review of the BSc in Physical Education with Biology, the BSc in Physical Education with Mathematics, and the BSc in Science Education took place between January and November 2013, in accordance with the Council's review strategy. The process was formally initiated when the Review Panel (hereinafter referred to as 'the panel') was appointed by the Teaching Council's Director, with Professor Sheelagh Drudy as Chairperson.¹ To assist and support the work of the panel, Dr Patrick O'Connor was appointed as Rapporteur. His functions included liaison with DCU, maintaining records of meetings, and drafting and finalising the panel's report in conjunction with the panel Chairperson. The panel was also supported in its deliberations by external subject experts and by the Director and staff of the Teaching Council.

Documentation relating to the application was submitted to the Teaching Council by DCU in January 2013. The panel met initially on 21 January 2013 to give preliminary consideration to the DCU submission. Following this meeting, individual members of the panel focused on specific aspects of the submission and circulated their comments and questions to other members of the panel. Issues for further clarification were identified by the panel and were communicated by the Rapporteur to DCU. Following consideration of the documentation and a collation of the initial views of the members of the panel, on 28 February 2013 the panel and Rapporteur met and engaged with staff members who made a presentation embracing the several elements of the programmes.² Subsequently, in the course of reviewing the documentation the panel maintained contact on a systematic basis both by e-mail and telephone. Moreover, on 21 March 2013 and again on 28 May 2013, the Chairpersons of three review panels and their Rapporteurs attended a meeting convened for the primary purpose of identifying commonalities of judgement and refining reporting conventions and procedures.

3. *Publication of this Report*

The Teaching Council routinely makes information available to the public in relation to its functions and activities and, in line with that practice, this report will be available on the Council's website, www.teachingcouncil.ie.

¹ Details of the Review Panel membership are included in Appendix I

² A list of the staff member presenters is included in Appendix II

4. Documentation

The documentation submitted in January 2013 by DCU was in accordance with the template provided by the Teaching Council in the Pro Forma and Guidelines which accompany the Council's review strategy.

Key areas of focus were:

4.1 Inputs

- Conceptual Framework
- The Programme
- Programme Aims
- Programme Design
- Areas of Study
- Teaching, Learning and Assessment Strategies
- School Placement
- The Duration and Nature of the Programme
- Student Intake
- Staffing
- Facilities
- Student Support and Guidance Systems
- Communication and Decision-Making Structures
- Financial Resources

4.2 Processes

- Teaching, Learning and Assessment Approaches
- Engagement of Student Teachers with the Programme
- Engagement of Student Teachers with Staff and with other Student Teachers
- Progression within the Programme
- Personal and Social Development
- Development of Professional Attitudes, Values and Dispositions
- Lifelong Learning
- Reflective Processes

4.3 Outcomes

- Knowledge-Breadth/Knowledge-Kind
- Know-How & Skill-Range/Know-How & Skill-Selectivity
- Competence-Context/Competence-Role
- Competence-Learning to Learn
- Competence-Insight

5. Overall Findings

Having regard to the documentation that was initially submitted, together with the complementary documentation that was provided pursuant to the meeting with programme staff, the panel adjudges that the programmes satisfy the criteria set down by the Teaching Council in its *Criteria and Guidelines* and in its curricular subject requirements. With particular regard to the latter criteria, the panel makes the following overall findings:

5.1 Programme 1: BSc in Physical Education with Biology

The programme meets the Teaching Council overall requirement of 90 ECTS credits of PE and the detailed breakdown of that overall requirement as set out in Appendix 3. The programme also meets the Council's requirements for biology and, with the inclusion of 10 ECTS credits of chemistry and 10 ECTS credits of physics, also meets the Council's requirements for the Junior Certificate subject, science. On that basis, the panel is happy to recommend that graduates may have the subjects physical education, biology and science (Junior Certificate) recorded on the Register of Teachers.

5.2 Programme 2: BSc in Physical Education with Mathematics

The programme meets the Teaching Council overall requirement of 90 ECTS credits of PE and the detailed breakdown of that overall requirement as set out in Appendix 3. The programme also meets the Council's requirements for mathematics. On that basis, the panel is happy to recommend that graduates may have the subjects physical education and mathematics recorded on the Register of Teachers.

5.3 Programme 3: BSc in Science Education

5.3.1 Specialism (a) chemistry and mathematics

The programme meets the Teaching Council overall requirement of 60 ECTS credits of chemistry and 60 ECTS credits of mathematics and the detailed breakdown of those overall requirements as set out in Appendix 3. As it includes 10 ECTS credits of biology and 10 ECTS credits of physics, the programme also meets the Council's requirements for the Junior Certificate subject, science. On that basis, the panel is happy to recommend that graduates may have the subjects; chemistry, mathematics and science (Junior Certificate) recorded on the Register of Teachers.

5.3.2 *Specialism (b) mathematics and physics*

The programme meets the Teaching Council overall requirement of 60 ECTS credits of physics and 60 ECTS credits of mathematics and the detailed breakdown of those overall requirements as set out in Appendix 3. As it includes 10 ECTS credits of biology and 10 ECTS credits of chemistry, it also meets the Council's requirements for the Junior Certificate subject, science. On that basis, the panel is happy to recommend that graduates may have the subjects physics, mathematics and science (Junior Certificate) recorded on the Register of Teachers.

5.3.3 *Specialism (c) physics and chemistry*

The programme meets the Teaching Council overall requirement of 60 ECTS credits of physics and 60 ECTS credits of Chemistry and the detailed breakdown of those overall requirements as set out in Appendix 3. As it includes 10 ECTS credits of biology, it also meets the Council's requirements for the Junior Certificate subject, science. On that basis, the panel is happy to recommend that graduates may have the subjects physics, chemistry and science (Junior Certificate) recorded on the Register of Teachers.

The panel readily acknowledges the difficulties faced by DCU (and other providers) in meeting the Teaching Council subject discipline criteria for concurrent undergraduate programmes and combining them with the criteria for foundation studies, professional studies and school placement. This is especially the case where subject disciplines require a minimum of 90 ECTS credits and where, for good professional reasons, a provider wishes to offer another teaching subject with a minimum requirement of 60 credits. The panel acknowledges the exceptional efforts which DCU has made to map its programmes to the Teaching Council criteria and to maintain high standards and meet its own Academic Council regulations. Accordingly, the panel recommends to the Teaching Council that the programmes be granted accreditation. The panel proposes that accreditation of the programmes would have a lifespan of five years.

The commendations in Section 6 below relate to areas of particular strength which the panel has identified.

With regard to the recommendations in Section 7, the panel suggests that the Teaching Council should require the university to set out and submit, within twelve months of receiving the final review report, its proposals for implementing the recommendations. It further recommends that the Teaching Council should prioritise those areas to be accorded particular attention when the programmes fall due for re-accreditation.

In the case of the national issues raised in Section 8 of this report, the panel recommends that the Council engage in dialogue on those issues at national level.

6. Commendations

Having regard to:

1. the documentation which was submitted
2. advice received from the subject specialists who supported the review process, and
3. information gleaned during the meeting with DCU,

the panel has noted a number of particular strengths of the programmes, as follows:

6.1 Engagement with the review process

The ready co-operation of DCU staff in clarifying emerging issues, in supplementing documentation and in providing sound rationales for the programmes highlighted a praiseworthy commitment to facilitating the review process.

6.2 The submission documents

The submission documents give witness to an admirable determination to deliver a series of academic programmes that meet the needs of an evolving modern society. They display a strong sense of purpose to equip students with high standards of technical proficiency that is firmly rooted in a robust linking of theory and practice. The programmes are characterised by a constructivist approach that celebrates inquiry based learning, and this is balanced by a measured deployment of behaviourist approaches. Underpinning all of this is a commendable emphasis on critical reflection that is seen as a key element of a lifelong learning paradigm.

The documents supplied are highly comprehensive and have proved most useful in identifying the breadth and depth of the intended learning experiences. Of particular value has been the tabular alignment of conceptual framework with the aims of the programmes and, in parallel with this, the alignment in grid form of interrelated aspects of areas of study with specific modules. All this is usefully carried into a further alignment of learning outcomes with relevant subject areas, and the overall impression given is of a highly coherent and carefully constructed suite of programmes.

6.3 Aims and learning outcomes

The aims and expected learning outcomes of each of the programmes, as set out in the submission, are expressed in a clear and concise manner. They reflect a well-aligned, rich and productive interplay between the university's objectives and those of the Teaching Council, and give witness to a vision of teaching as a transformative process that seeks to develop core knowledge, attitudes and technical proficiency.

6.4 The three 'Is' – innovation, integration and improvement

The panel commends DCU for its purposeful incorporation into the programmes of the objectives of the 'Three Is' of innovation, integration and improvement that also proficiently reflects the *DCU Generation 21* initiative. These objectives align well with those which underpin the Teaching Council's policy on the continuum of teacher education. The panel recognises in the documentation a firm commitment to the application of fresh thinking, a desire to provide programmes characterised by high levels of cohesion and a determination to produce reflective, enquiry-oriented, life-long learners.

In all of this, the panel recognises a dual focus on developing knowledge, skills, competences and attitudes for a career in teaching and, in parallel, a focus on developing an appropriate content knowledge in PE, the sciences and mathematics. For their efforts to create and maintain a learning environment that challenges and supports creative, solution-orientated teachers who have developed a personal understanding of the nature and purposes of education, the designers of each of the programmes are worthy of commendation.

6.5 Commitment of staff and cross-disciplinary team work

The level of commitment exhibited by the faculty to the delivery of each of the programmes is highly impressive. This is characterised by an openness and wholeheartedness that facilitates a vibrant level of productive communication across the various subjects. This interplay of ideas is rooted in systematic reflection on practice by multi-disciplinary teams, and centres not only on personal research interests but also on the pedagogy best suited to each subject. Semi-annual meetings between the management group and part-time pedagogy teachers form part of the process. The panel commends this cultivation of professional dialogue, it recognises its effectiveness in promoting a highly desirable sense of identity among staff members across departments and is confident that it makes a significant contribution to the promotion of good teaching and integrated learning across all programmes. The panel was, thus, very impressed with the level of good communication and mutual respect displayed by staff from the different disciplinary areas. This mutual respect is both fostered and supported by formal structures within the university.

6.6 Facilities

DCU is well endowed in terms of facilities. This is a modern university campus, with extensive teaching and learning, sporting, social and leisure facilities. There are microteaching suites, PE pedagogy labs, PE analytical areas (performance analysis), a Sports Centre and a Maths Learning Centre. There is also a well-stocked library, impressive ICT facilities and a Disability and Learning Support Service that facilitates students with disabilities in their accessing of the various facilities.

Of particular note is the dedicated science laboratory. The panel recognises that the ready availability of a science laboratory is fundamental to the success of any programme that is dedicated to the teaching of the sciences. While in the past a necessary sharing of facilities with unrelated science departments in the university led to certain level of compromise in terms of timetabling, the science teaching programmes have now acquired a bespoke science education teaching laboratory. This has been designed in accordance with programme needs, it is fully controlled by the programme leaders and facilitates a more focused concentration on relevant learning episodes at convenient times. Further, this allows for a lowering of staff/ student groups, to the effect that no more than twenty students form one group in Chemistry, for example. This is commendable and not least for its potential to facilitate a keener integration of pedagogy with laboratory activity.

DCU also boasts an excellent sports complex which includes sports halls, a swimming pool, gymnasium, a climbing wall, elite training facilities and a number of all-weather soccer pitches. Available also to students are a rugby pitch and one floodlit astro-turf pitch suitable for hockey or soccer. The panel sees the provision of these sports facilities as fundamental to the emergence of competent PE teachers.

6.7 Links with its cooperating teachers

A strength of the university is seen in its nurturing of links with its cooperating teachers and the development of their skills in respect of target-setting, student support and enquiry based science teaching and assessment. In this regard, the panel is impressed by the success of three initiatives: *COPET*, *Establish and Sails* and the *Amgen Science Teacher Training Initiative*. These are research projects which relate to teacher professional development for cooperating teachers in physical education and/or in science education. These projects are funded either through private, philanthropic or European sources. The panel understands that it is intended to extend the focus of these initiatives to embrace the three programmes in a more comprehensive way and commends the university for its endeavours to do so.

6.8 Exit arrangements

When in close and continuous liaison with different school placement tutors the Director of School Placement and Programme Chair identify a student who is experiencing difficulty, s/he is offered a variety of supports. But if it becomes clear, ultimately, that the student is not suitable for the teaching profession an exit mechanism is triggered and this allows the student choose to begin study at Year 1 of another programme within DCU. Further, a student may transfer to Year 2 or 3 of programmes subject to rules and regulations in place in respect of the chosen programme. For example, a Science Education student who fails either Year 2 or 3 may transfer to (the second or third year of) the BSc of Applied Physics. The panel recognises this arrangement as commendable.

6.9 Inclusion

The panel commends DCU for its commitment to the inclusion of students with disabilities who are suited to and wish to pursue a qualification in teaching. It welcomes too the way in which this commitment to inclusion is reflected in some modules, for example *Inclusion and Adaptation, PE and Physical Activity* (Module SS321) of the physical education programme.

6.10 Academic subjects

6.10.1 Physical Education

(a) The conceptual framework

The conceptual framework provides a detailed theoretical overview of the philosophy and rationale for the programmes. The varied and integrated approach to teacher education is well articulated and embedded in a strong theoretical context. The principles, beliefs and values focus on the emergence of student teachers as professional reflective practitioners. A commitment to continuing professional learning is a central feature of the conceptual framework. The general and specific aims provide a global overview of the knowledge, skills and competences required of the graduate teacher as a professional educator and teacher of physical education at post-primary level. All this is commendable.

(b) Physical education modules

The specific study of physical education is comprised of 90 ECTS credits, with 25 ECTS credits allocated between the third year and fourth year of the PE with Biology (PEB) and PE with Mathematics (PEM) programmes. This meets the requirements for the PE programme as specified by the Teaching Council.

The panel recognises the considerable efforts taken by DCU to construct a meaningful and developmental programme of study to prepare its student teachers for their chosen career and to meet the registration requirements of the Teaching Council. There is sufficient depth and breadth of content to ensure graduates are prepared to deliver the prescribed PE programmes to all curricular levels and programmes in the post-primary sector.

Some modules support an integrated approach for students to develop their knowledge, skills and competences in the Applied Studies components. In such cases, the principles, concepts and strategies specific to the physical activities are embedded through the development of

knowledge of the psychomotor, cognitive or affective factors that influence learning. This commendable approach to module design within the subject specialism facilitates students to connect theory with its practical application. Both the PEB and PEM programmes meet the required allocation of 60 ECTS credits for the Applied Studies components of the subject specialism, as specified by the Teaching Council.

The panel welcomes the approach taken by DCU to facilitate its students should they wish to acquire accreditation from some of the national governing bodies (NGBs) of sport. This aligns students' competences within the national coaching qualification structures and has the potential to deepen their understanding of their chosen physical activities and sports.

6.10.2 Biology (in BSc in Physical Education with Biology) (PEB)

The conceptual framework gives assurance that biology students will benefit from a comprehensive learning experience and will graduate having acquired a sound theoretical and practical understanding of their subject. The various modules expose them to the knowledge required for the delivery of the Leaving Certificate biology syllabus in respect of both theory and practice, and the emphasis on the cultivation of the reflective dimension offers the promise of an enduring and productive engagement with biology. All this is commendable. In the selection of appropriate themes, the panel also notes an admirable integration of biology with PE and recognises therein the potential for an enhanced appreciation of the links between both areas.

6.10.3 Chemistry (in BSc in Science Education)

The panel commends the faculty for its purposeful construction of a suite of chemistry modules that exhibits a rich potential to combine the knowledge, skills and attitudes of a chemist and those of a teacher at post-primary level. There are many interrelated aspects that pivot on a knowledge of Leaving Certificate chemistry (see Appendix 3) and Junior Certificate science and their relationship to each other and, appropriately, there is a vital focus on the necessary pedagogical skills that will facilitate an understanding of the nature of chemistry and its role in contemporary society. All this provides an assurance that students will have a creditable grounding in chemistry and an adequate measure of confidence to build on their knowledge as they grow in experience.

6.10.4 Physics (in BSc in Science Education)

The panel commends the course team for a strong programme in physics which fulfils the requirements for Leaving Certificate physics (see Appendix 3), and for the clear introduction of inquiry based learning within the physics elements of the course. This is an approach to pedagogy that is both written into the programme, and appears as a key feature of the Centre for Advancement of Science & Mathematics Teaching and Learning, CAS[M]TeL. This work forms an interesting part of developmental programmes with participating schools and cooperating teachers.

6.10.5 Mathematics (in BSc in Science Education, and BSc in Physical Education with Mathematics, 'PEM')

The panel commends the course team for a strong and compliant programme in mathematics which fulfils the requirements for Leaving Certificate Mathematics (see Appendix 3), which provides a sound basis for the teaching of mathematics at post-primary level.

7. Recommendations

Having regard to:

1. the documentation which was submitted
2. advice received from the subject specialists who supported the review process, and
3. information gleaned during the meeting with DCU

the panel has noted a number of areas of the programmes which it recommends be developed.

They are as follows:

7.1 Feasibility of the extension of the programmes

The panel acknowledges the pressures placed upon providers of four year post-primary concurrent programmes by the (very welcome) increase in the number of ECTS credits which must be allocated to the education components. The panel also acknowledges the innovative ways in which these enhanced requirements have been addressed in each of the programmes in order to maintain high standards in the disciplinary areas. These have involved increasing the number of ECTS credits from 240 to 280 in the case of the BSc in Science Education, to 282.5 in the case of the BSc in PE with Biology, and to 265 in the case of the BSc in PE with Mathematics. These increases will result in very intensive workloads for both staff and students over the four years of the programmes and the panel is concerned that it might impede efforts aimed at developing the students as reflective practitioners.

The number of credits is outside the current recommended workloads for two semester, four year, undergraduate programmes in the current guidelines for implementation of the European Credit Transfer and Accumulation System (ECTS) within the Bologna framework of the European Higher Education Area (see, for example, Education and Culture DG, 2009, *ECTS Users Guide*). The panel therefore recommends that, within the lifetime of this accreditation, DCU actively considers the feasibility of extending the programmes to five years, with a redefinition of some of the final year modules to Level 9 on the National Framework of Qualifications. Models for such a structure for concurrent ITE post-primary programmes currently exist in Ireland, the U.K. and elsewhere in Europe.

In the meantime the panel strongly recommends that, before a second cohort enters the programmes, the teams restructure the programmes so that parts of it are provided during the third semester, thereby allowing it to more closely adhere to Bologna recommendations and to reflect DCU's own regulations pertaining to academic sessions³.

³ The DCU regulations permit a maximum allowable number of ECTS credits in an academic session of 75.

7.2 School placement

7.2.1 Subject specialist visits

In respect of the three programmes, students undertake three placements - four weeks in years two and three, and fourteen weeks in the final year. In the course of these placements, there are visits from a number of placement tutors, some of whom are subject specialists and others who are from the School of Education. It is noted, with approval, that these tutors come well briefed on university procedures and have attended workshops designed to establish a high measure of consistency between them in respect of grade allocations.

However, there is a measure of concern among panel members in respect of the number of specialist placement visits. This is rooted in the observation that in Year 2 in the BSc in Science Education, the norm is just one subject specialist visit in addition to one visit from a School of Education specialist, and in Year 4 there are just two subject specialist visits, plus two from the School of Education. (In noting this, the panel acknowledges that there can be additional visits, depending on student performance and other circumstances.) The circumstances are similar with regard to PEB and PEM: two subject specialist visits in Years 2 and 4 in addition to one from the School of Education in Year 2 and two from Education in Year 4. In effect this means that in each of these two years, there may be just one observation by a subject specialist of each of a student's subject specialisms (and in Year 2 of the BSc in Science Education).

Given all of this, the panel is not convinced the number of subject specialist visits is adequate. Accordingly, it recommends that DCU endeavours to increase the number of subject specialist visits across the BSc in Science Education, PEB and PEM, ideally by a placement tutor who combines expertise both in education and in the subject discipline, so that a student has the benefit of two visits per subject specialism in Years 2 and 4.

While the normal workload for an undergraduate is 60 ECTS the workload may be greater than this where learning activities continue outside the standard academic two semesters (see DCU, Regulations pertaining to academic session 2.2.4 and 2.2.6.)

7.2.2 School placement tutors

The panel is satisfied that, across the three programmes the placement tutors from the School of Education are qualified and experienced, but it notes that few are qualified either in the sciences or, apparently, in mathematics. While accepting the well-argued position of the programme heads that this ought not to be viewed as a shortcoming of great significance, it remains a concern of the panel that DCU does not have a higher proportion of placement tutors from the School of Education who are specifically qualified in the subject which they supervise. Accordingly, to the extent to which DCU can recruit placement tutors who combine registered teaching experience with a professional background in the sciences and mathematics, the panel recommends that it does so.

7.3 Literacy and numeracy

It is readily acknowledged that students' literacy and numeracy skills are addressed in a number of modules across the suite of programmes, and specifically so in the area of written assignments in respect of literacy. However, the panel recommends that DCU provides a greater measure of detail in its module descriptors on how it develops students' awareness, knowledge and competency to integrate literacy and numeracy as teachers of their subject specialisms. This would serve to bring the fundamental elements of its approach more clearly and more fully into focus and give assurance that the programmes meet the intentions of *The National Strategy to Improve Literacy and Numeracy* (DES, 2011).

7.4 Child protection issues

The issue of child protection is integral and essential with regard to all programmes which prepare students who will have contact with children as part of their professional work. Moreover, it is of particular centrality in the case of the preparation of PE teachers.

While the panel accepts that child protection issues are addressed across the suite of programmes (Module ES479 *School Placement Preparation and Professional Development* refers specifically to the issue), it recommends that a greater measure of detail be provided, particularly in advance of students' initial placement working with children, so that the intended student learning outcomes in relation to child protection become more readily apparent.

7.5 Health and safety

The panel acknowledges a ready acceptance by the programme teams of the importance of health and safety in developing student awareness of pupil welfare. However, it needs assurance that this issue, and with it the process of risk assessment, is given due prominence across all programmes, having regard to the particular risks associated with PE and the laboratory aspects of the sciences, and the management of these risks in a classroom setting. To that end, it is recommended that health and safety issues are integrated into relevant modules in a consistent and systematic way so that pupil safety and general welfare are optimised.

7.6 Resource allocation

The panel shares with DCU a concern that any diminution of the present resource allocation would likely impact significantly on the quality of teacher education programmes. Further, the panel recommends that additional full- time and part-time staff should be appointed.

7.7 Academic subjects

7.7.1 Physical Education (in PEB)

- a) For the purpose of clarity, the panel recommends that DCU ensures that students' learning of biomechanics and human growth and development are explicitly identified within the specific learning outcomes of the physical education modules.
- b) When timetabling the sports facilities, the panel recommends that DCU should give priority to the physical education department to facilitate the effective delivery of the Applied Studies modules of the physical education programmes.

7.8 Entry requirements

The panel has concerns about the current entry requirements of grade C3 in Ordinary Level or D3 in Higher Level Leaving Certificate mathematics. For example, analysis of student performance at DCU over the last number of years has shown that students at the lower end of this scale (below A2 in Ordinary Level) struggle with the programme and do not progress to Year Two. Arising from this, we recommend to DCU that it reflects on the desirability of raising the minimum entry requirement in mathematics for all concurrent science and mathematics teacher education programmes.

8. National Issues

Having regard to:

1. the documentation which was submitted
2. advice received from the subject specialists who advised the panel, and
3. information gleaned during the meeting with DCU,

the panel has noted the following issues which it believes merit further attention by the Teaching Council and/or other national stakeholders.

8.1 Length of concurrent programmes of teacher education (post-primary)

The Panel recommends that the accreditation criteria for concurrent post-primary programmes be reviewed, and in particular the required ECTS credit weightings for such programmes, with a view to ensuring equivalence between consecutive and concurrent routes, in terms of the quality of programmes. Formerly, four-year concurrent programmes at post-primary were assumed to have an equivalence with an undergraduate degree followed by a post-graduate diploma in education (i.e. 180/240 ECTS credits, followed by 60 credits). From September 2014 onwards, the consecutive route will consist of 180/240 ECTS credits (undergraduate degree) and 120 ECTS credits (postgraduate teaching qualification, henceforth normally at masters level). However, concurrent post-primary programmes will normally consist of 240 ECTS, of which 120 will comprise of education components and 120 of subject discipline components (in the case of degrees in which there are two subject disciplines each subject must amount to the minimum Teaching Council requirement of 60 credits, or 90 credits in respect of PE and certain other subjects).

While the panel warmly endorses the increase in education components in both concurrent and consecutive programmes, it is concerned that equivalence can no longer be automatically assumed with regard to the coverage of subject disciplines. This is particularly relevant in respect of concurrent post-primary ITE programmes that combine preparation for two disciplinary degree subjects with the mandatory 120 education credits: here the current allocation of 120 credits to the disciplinary areas can be quite restrictive. This problem is even more acute where a minimum of 90 credits for one of the subject specialisms are required by the Council. These issues create difficulties for HEIs when they endeavour to meet the Teaching Council criteria, align with Leaving and Junior Certificate curricula and map to the Bologna Framework with regard to recommended ECTS credits.

These are major issues which must be addressed by the Teaching Council and the HEIs. These have already been raised by the Council in a letter to the HEIs of 15 June 2012 under the heading of *Balance of Programme Components*. The issue of anomalies is raised therein too and as an overall comment the Council notes that some HEIs are planning to develop innovative five year programmes.

8.2 Market demand for graduates

Given current economic circumstances and the allied reduction of teaching positions, the panel advises Council to undertake a study to determine with some precision the market demand for graduates of a spectrum of programmes.

8.3 Curriculum design and assessment

In the context of the proposed changes to the junior cycle programme, and of international best practice, all teacher education programmes should be required to make visible their approach to curriculum design and assessment. In practical terms, this requires a greater emphasis on the theory and practice of formative and summative assessment and on the uses and limitations of testing. The Teaching Council's criteria and associated Pro Forma and Guidelines should be kept under review, having regard to the evolving context for the junior cycle.

Appendix 1 – Review Panel Membership

Chair – Professor Sheelagh Drudy

Professor Drudy is Professor Emeritus of Education at University College Dublin. She is a former teacher, educational researcher and teacher educator. She was a member of the first Teaching Council appointed by the Minister in 2005. She is currently an external examiner at a number of Higher Education Institutions and has been involved in quality assurance reviews in various HEIs. She chaired the panels which reviewed the Higher Diploma in Art for Art and Design Teachers provided by Limerick Institute of Technology in 2011, and the four degree programmes provided by St. Patrick's College, Thurles in 2012.

Teacher Educator – Professor Mike Watts

Professor Watts is Professor of Education at Brunel University, London. He is a Fellow of the Institute of Physics, a chartered Physicist, and also a Fellow of the UK's Higher Education Academy. Professor Watts was awarded Doctor of Philosophy from the University of Surrey as well as a Certificate of Education (in Physics and Mathematics) from Doncaster College of Higher Education. Professor Watts has been an honorary visiting Professor at several universities, is currently an external examiner for a number of universities in Ireland and elsewhere, and has been involved in quality assurance reviews in various HEIs.

Teaching Council Member – Lily Cronin

Lily Cronin was re-elected to the Teaching Council in the Connacht/Munster/Ulster, Voluntary (post-primary) constituency. She is a practising teacher of science and biology at Mercy Mount Hawk in Tralee and is in her third term as a Teaching Council Member. Lily has 35 years' experience of classroom methodology and management. She also has considerable experience of the Council's Review and Accreditation process, having already served on three review panels for the Council, namely, the panels which reviewed the Bachelor of Science (Education) in Physics and Chemistry in UL in 2010, Postgraduate Diploma in Education in NUI Maynooth in 2011 and the H.Dip in Art for Art and Design Teachers in LIT in 2011.

DES Inspector – Seánie McGrath

Seánie McGrath is a graduate of Thomond College, Limerick and also holds a Masters degree in Exercise Science from the University of Limerick. Prior to being appointed as a Physical Education Inspector with the Department of Education and Skills, he spent nineteen years teaching in a variety of settings including working with people with learning disabilities, DEIS post-primary and as an Assistant Principal with Co. Cork VEC. He has extensive experience in high performance sport, community health, and sport for persons with disabilities.

Rapporteur – Dr Patrick O’Connor

Dr Patrick O’Connor, was an inspector with the DES for over thirty years. During this time he worked on the development of whole school evaluation, and when attached to the policy unit was centrally involved in the monitoring of teacher education. For over ten years he was editor of the DES academic journal *Oideas*. A former primary school principal and associate lecturer on the OU MA (Ed), he is a graduate of St Patrick’s College, Drumcondra, and UCD, he holds masters degrees from UCC and OU, and his OU doctorate centred on school inspection.

Appendix 2 – Programme staff who attended the meeting on 28 February 2013

The following programme staff made presentations and/or engaged in discussion with the review panel in Dublin on 28 February 2013.

Dr. Johann Issartel – Lecturer in Health and Human Performance; Programme Chair for the BSc in PE with Biology and the BSc in PE with Mathematics (PEB/PEM Chair)

Dr. Brien Nolan - Senior Lecturer in Mathematics; Programme Chair for the BSc in Science Education (SE Chair)

Dr. Odilla Finlayson – Senior Lecturer in Science Education (Chemistry)

Dr. Paul van Kampen – Senior Lecturer in Science Education (Physics)

Dr. Joe O'Hara – Senior Lecturer in Education; Head of School of Education Studies

Dr. James Lovatt - Lecturer in Science Education

Dr. Michael Parkinson - Senior Lecturer in Biotechnology

Dr. Catherine Woods - Senior Lecturer in Health and Human Performance

Ms. Eimear Holland - Lecturer in Health and Human Performance

Appendix 3 - Teaching Council Registration Curricular Subject Requirements (Post-Primary), for persons applying for registration on and after 1 January 2017

Biology

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of biology, an applicant must meet **all** of the following criteria.

1.
 - a. Applicants must hold a degree level qualification, with biology/biological sciences studied up to and including third year level or higher (or modular equivalent).
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass⁴ result in all examinations pertinent to the subject of biology.
 - c. The qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of biology/biological sciences comprising at least 60 ECTS credits (or equivalent) and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of biology/biological sciences during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the biology syllabus⁵ to the highest level in post-primary education (see www.curriculumonline.ie). To meet this requirement the degree must include the study of at least four of the following essential areas to a minimum total of 40 ECTS credits (or equivalent) with at least one area from a, b or c:

⁴ Which includes pass by compensation

⁵ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

Essential Areas of Study

- (a) Botany
- (b) Plant physiology
- (c) Ecology
- (d) Microbiology
- (e) Zoology
- (f) Mammalian anatomy
- (g) Mammalian physiology
- (h) Biochemistry
- (i) Genetics
- (j) Molecular biology

The remaining 20 ECTS credits (or equivalent) may be in any of the above essential areas, or be drawn from the following optional areas:

Optional Areas of Study

- (k) Biotechnology
- (l) Bioinformatics
- (m) Pharmacology
- (n) Biosciences
- (o) Environmental biology

3. Experimental/practical work must be completed throughout the degree course.
4. Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 year range) carrying a minimum of 120 ECTS credits (or equivalent)⁶. The programme should include a methodology module(s) on the teaching of a science based subject with a minimum of 5 ECTS credits (or equivalent)⁷.

Science (Junior Certificate)

An applicant who meets the registration criteria for **biology** will also be deemed to have acquired the competency to teach the Junior Certificate curricular subject **science** if he/she has studied a minimum of 10 ECTS credits (or equivalent) in chemistry and a minimum of 10 ECTS credits (or equivalent) in physics.

⁶ Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion

⁷ Applicants who have completed a specialist concurrent degree in biology must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits.

Chemistry

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of Chemistry, an applicant must meet **all** of the following criteria.

1.
 - a. Applicants must hold a degree level qualification, with Chemistry studied up to and including third year level or higher (or modular equivalent).
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass⁸ result in all examinations pertinent to the subject of Chemistry.
 - c. The qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of Chemistry modules comprising at least 60 ECTS credits (or equivalent) and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of Chemistry during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the Chemistry syllabus⁹ to the highest level in post-primary education (see www.curriculumonline.ie). To meet this requirement the degree must include the study of all of the following essential areas to a minimum of 40 ECTS credits (or equivalent);

Essential Areas of Study

- (a) Organic Chemistry¹⁰
- (b) Inorganic Chemistry¹¹
- (c) Physical Chemistry¹²
- (d) Analytical Chemistry¹³

⁸ Which includes pass by compensation

⁹ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

¹⁰ This may include modules in the areas of Structure and Reactivity of Organic Compounds, Functional Group Interconversions, Stereochemistry, Organic Reaction Mechanisms, Aromatic Chemistry, Organic Polymers, Organic Synthesis

¹¹ This may include modules in the areas of Main Group Chemistry, Transition Metal Chemistry, Organometallic Chemistry, Structure and Bonding

¹² This may include modules in the areas of Energetics and Kinetics, Thermodynamics, Chemical Equilibria, Quantum Mechanics, Electrochemistry

¹³ This section may be studied as “stand alone” modules in Analytical Chemistry or may be integrated into modules of Inorganic Chemistry, Organic Chemistry or Physical Chemistry. The study of Analytical Chemistry may include

The remaining 20 ECTS credits (or equivalent) may be in any of the essential areas above or may be drawn from the following optional areas:

Optional Areas of Study

- (e) Environmental Chemistry¹⁴
- (f) Materials Chemistry¹⁵
- (g) Pharmaceutical Chemistry/Biopharmaceutical Chemistry¹⁶
- (h) Industrial Chemistry¹⁷

3. Laboratory practical work in chemistry must have been completed throughout the degree programme.
4. Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 year range) carrying a minimum of 120 ECTS credits (or equivalent)¹⁸. The programme should include a methodology module(s) on the teaching of a science based subject with a minimum of 5 ECTS credits (or equivalent)¹⁹.

Science (Junior Certificate)

An applicant who meets the registration criteria for **chemistry** will also meet the requirements for the Junior Certificate curricular subject **science** if he/she has studied a minimum of 10 ECTS credits (or equivalent) in biology and a minimum of 10 ECTS credits (or equivalent) in physics.

Instrumentation in Chemical Analysis and Spectrometry (atomic absorption, ultraviolet, infrared, NMR, mass spectrometry) GC, HPLC, electrochemical methods, solvent extraction

¹⁴ This may include modules in the areas of Water Chemistry, Atmospheric Chemistry, Pollutants in the Environment.

¹⁵ This may include modules in the areas of Solid State Chemistry, Crystallography, Band Structure.

¹⁶ This may include modules in the areas of Drug Design, Structure-Activity Relationships, Synthetic Methods.

¹⁷ This may include modules in the areas of Batch Process, Continuous Process, Industrial Safety, Industrial Case Studies.

¹⁸ Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion

¹⁹ Applicants who have completed a specialist concurrent degree in Chemistry must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits

Physics

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of physics, an applicant must meet **all** of the following criteria.

1.
 - a. Applicants must hold a degree level qualification, with physics studied up to and including third year level or higher (or modular equivalent).
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass²⁰ result in all examinations pertinent to the subject of physics.
 - c. the qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of physics comprising at least 60 ECTS credits (or equivalent) and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of physics during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the physics syllabus²¹ to the highest level in post-primary education (see www.curriculumonline.ie). To meet this requirement the degree must include the study of at least 8 of the following areas:
 - (a) Classical Mechanics
 - (b) Quantum Mechanics
 - (c) Properties of Matter
 - (d) Oscillations, Waves, Acoustics
 - (e) Thermodynamics
 - (f) Light
 - (g) Electromagnetism, Electromagnetic Waves
 - (h) Electronics
 - (i) Condensed Matter
 - (j) Relativity
 - (k) Atomic, nuclear and particle physics
 - (l) Topic in advanced or applied physics

²⁰ Which includes pass by compensation

²¹ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

3. Experimental/practical work must be completed throughout the degree course.
4. Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 years) carrying a minimum of 120 ECTS credits (or equivalent)²². The programme should include a module(s) on the teaching of a science based subject carrying a minimum of 5 ECTS credits (or equivalent)²³.

Science (Junior Certificate)

An applicant who meets the registration criteria for **physics** will also be deemed to have acquired the competency to teach the Junior Certificate curricular subject **science** if he/she has studied a minimum of 10 ECTS credits (or equivalent) in Chemistry and a minimum of 10 ECTS credits (or equivalent) in biology.

²² Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion

²³ Applicants who have completed a specialist concurrent degree in physics must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits

Physics and Chemistry

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of Physics and Chemistry, an applicant must meet **all** of the following criteria.

Applicants should note that meeting the registration requirements for the curricular subject of Physics and Chemistry (combined syllabus) does not automatically imply that registration requirements for the individual subjects of physics or chemistry have been met.

1.
 - a. Applicants must hold a degree level qualification, with Physics and Chemistry studied in the degree with the study of at least one of the subjects up to and including third year level or higher.
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass²⁴ result in all examinations pertinent to the subjects of Physics and Chemistry.
 - c. The qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of Physics and Chemistry comprising at least 60 ECTS credits (or equivalent) with at least 15 ECTS (or equivalent) in physics and 15 ECTS (or equivalent) in Chemistry and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of Physics and Chemistry during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the Physics and Chemistry syllabus²⁵ to the highest level in post-primary education (see www.curriculumonline.ie).
To meet this requirement the degree must include the study of at least **four of the following physics areas (a) to (g)** and **at least two of the Chemistry areas (h),(i),(j)**:

²⁴ Which includes pass by compensation

²⁵ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

- (a) Classical Mechanics
- (b) Quantum Mechanics
- (c) Oscillations, Waves, Acoustics
- (d) Thermodynamics
- (e) Light
- (f) Electromagnetism, Electromagnetic Waves
- (g) Atomic, nuclear and particle physics

The degree must also include the study of **at least two of the following Chemistry areas:**

- (h) Organic Chemistry
- (i) Inorganic Chemistry
- (i) Physical Chemistry

3. Experimental/practical work must be completed throughout the degree course.
4. Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 years) carrying a minimum of 120 ECTS credits (or equivalent)²⁶. The programme should include a module(s) on the teaching of a science based subject carrying a minimum of 5 ECTS credits (or equivalent)²⁷.

Science (Junior Certificate)

An applicant who meets the registration criteria for **physics and chemistry** will also meet the requirements for the Junior Certificate curricular subject **science** if he/she studied a minimum of 10 ECTS credits (or equivalent) in biology.

²⁶ Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion

²⁷ Applicants who have completed a specialist concurrent degree in physics must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits

Mathematics

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of Mathematics, an applicant must meet **all** of the following criteria.

1.
 - a. Applicants must hold a degree level qualification, with Mathematics studied up to and including third year level or higher (or modular equivalent).
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass²⁸ result in all examinations pertinent to the subject of Mathematics.
 - c. The qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of Mathematics comprising at least 60 ECTS credits (or equivalent) and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of Mathematics during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the Mathematics syllabus²⁹ to the highest level in post-primary education (see www.curriculumonline.ie). To meet this requirement the degree must include the study of all of the following essential areas to a minimum of 40 ECTS credits (or equivalent):

Essential Areas of Study

- | | |
|--|------------------------------|
| (a) Analysis ³⁰ | - minimum of 10 ECTS credits |
| (b) Algebra ³¹ | - minimum of 10 ECTS credits |
| (c) Geometry ³² | - minimum of 5 ECTS credits |
| (d) Probability and Statistics ³³ | - minimum of 5 ECTS credits |

²⁸ Which includes pass by compensation

²⁹ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

³⁰ This must include modules in Differential and Integral calculus in one and several variables, and may include modules in Differential Equations, Complex Analysis, Abstract Analysis, Measure and Integral, or Topology.

³¹ This must include modules in Linear Algebra, and may include modules on Abstract Algebra (Groups, Rings, and Fields), Cryptology, Coding Theory, or Number Theory.

³² This must include a module or modules in Euclidean and Non-Euclidean Geometry and may include modules in Differential Geometry, Algebraic Geometry, or Topology.

³³ This must include modules in Probability and Statistical Inference and may include modules in Combinatorics or Stochastic Processes.

The remaining 20 ECTS credits (or equivalent) may be in any of the above essential areas, or be drawn from the following optional areas:

Optional Areas of Study

- (e) Dynamical Systems and Chaos
- (f) Calculus of Variations
- (g) Numerical Analysis or Computational Mathematics
- (h) Mathematical Modelling
- (i) Discrete Mathematics
- (j) History or Philosophy of Mathematics
- (k) Mathematical Logic
- (l) Set Theory and Cardinality

Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 years) carrying a minimum of 120 ECTS credits (or equivalent)³⁴. The programme should include a module(s) on the teaching of Mathematics carrying a minimum of 5 ECTS credits (or equivalent)³⁵.

³⁴ Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion

³⁵ Applicants who have completed a specialist concurrent degree in Mathematics must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits

Physical Education

In order to meet the registration requirements set down in the Teaching Council [Registration] Regulations 2009 in respect of the curricular subject of Physical Education, an applicant must meet **all** of the following criteria.

1.
 - a. Applicants must hold a degree level qualification, with Physical Education studied up to and including third-year level or higher (or modular equivalent).
 - b. The qualifying degree must be equivalent to at least Level 8 on the National Framework of Qualifications (NFQ) and with a minimum pass³⁶ result in all examinations pertinent to the subject of Physical Education.
 - c. The qualifying degree must carry at least 180 ECTS (European Credit Transfer System) credits (or equivalent) with the specific study of Physical Education comprising at least 90 ECTS credits (or equivalent) and with not less than 10 ECTS credits (or equivalent) studied at third year level or higher (or modular equivalent).
2. The study of Physical Education during the degree must show that the holder has acquired sufficient knowledge, skills and understanding to teach the Physical Education syllabus³⁷ to the highest level in post-primary education (see www.curriculumonline.ie).
 - (a) To meet this requirement the degree must include the study of **all** of the following to a minimum of 60 ECTS credits (or equivalent):
 - i. Adventure Activities
 - ii. Aquatics
 - iii. Athletics
 - iv. Dance
 - v. Games
 - vi. Gymnastics
 - vii. Health-Related Activity

³⁶ Which includes pass by compensation

³⁷ as approved by the Minister for Education & Skills, and published by the National Council for Curriculum and Assessment (NCCA)

(b) The degree course must also include the study of **all** of the following to a minimum of 30 ECTS credits (or equivalent):

- i. Anatomical, Physiological and Biomechanical aspects of Movement
- ii. Factors which inhibit and promote (Personal, Biological, Psychological, Sociological, Environmental) participation in physical activity and sport.
- iii. Disability and Movement
- iv. Historical, Sociological and Philosophical aspects of Physical Education.
- v. Growth, Motor Skill Learning and Development of the Child and Adolescent.
- vi. Physical Activity/Sport Promotion and Health across the lifespan.
- vii. Artistic and Creative Studies

3. Applicants must also have completed a programme of post-primary initial teacher education (age range 12-18 years) in which the theory, methodology and practice of teaching Physical Education forms the central aspect. This course must be equivalent to a minimum of 120 ECTS credits (or equivalent)^{38 39}.

³⁸ Applicants who have commenced a programme of initial teacher education prior to 1/01/2014 carrying less than 120 ECTS credits may be exempted from this requirement at the Council's discretion.

³⁹ Applicants who have completed a specialist concurrent degree in Physical Education must meet all of the requirements as detailed above. This course should be equivalent to a minimum of 240 ECTS credits.