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1. Overview of the Programme – General Information

1.1. Title of Programme

Master of Science in Clinical Laboratory Science.

1.2. Award Sought

Masters of Science in Clinical Laboratory Science from the Dublin Institute of Technology. This award will be classified in the distinction and pass degree categories.

1.3. Programme Specification and Duration

This is an Irish National Framework of Qualifications level 9 programme delivered in the Dublin Institute of Technology (hereafter DIT). The programme is currently being delivered as a two year part-time programme. A full-time version of the programme delivered over one calendar year is also approved.

1.4. Rationale for the course

The MSc in Clinical Laboratory Science is delivered by the Dublin Institute of Technology. This programme continues as the MSc in Clinical Laboratory Science which has been delivered since 2011 until today and that had previously evolved from the well-established and highly successful MSc in Molecular Pathology which originally commenced in 1997. Currently it is the only MSc Programme in the Republic of Ireland which is jointly accredited by the Academy of Clinical Science and Laboratory Medicine (ACSLM) and the Institute of Biomedical Science (IBMS, UK).

This MSc Programme is intended for those with an interest in the rapidly evolving field of Clinical Laboratory Science and the practice of contemporary laboratory diagnostics.

1.5. Relationship with Professional Bodies

As the professional representative bodies for Biomedical Scientists in Ireland and the UK, the ACSLM and the IBMS play a key role in the development of biomedical science within the healthcare sector and in the promotion of quality in biomedical science teaching and research. Membership of these bodies provides support and professional guidance in the progression of biomedical scientists through a contemporary career structure and also offers access to Continuous Professional Development (CPD) schemes to update and extend scientific knowledge and skills.

According to the present guidelines, promotion to the grade of Senior Medical Scientist in Ireland requires eligibility for Fellowship of the ACSLM plus a postgraduate degree in the field of Medical Laboratory Science, or possession of the Fellowship grade of the IBMS. Graduates of the M.Sc. Clinical Laboratory Science Programme are eligible for Fellowship of the Academy of Clinical Science and Laboratory Medicine (ACSLM) and the UK Institute of Biomedical Science (IBMS).
Full contact details are provided below:

- The Academy of Clinical Science and Laboratory Medicine, 31 Old Kilmainham, Dublin, Tel: 00353 1-9059703, Fax: 00353 1677 5652 (http://www.acslm.ie/)
- Institute of Biomedical Science, 12 Coldbath Square, London EC1R 5HL, Tel: +44 20 7713 0214, (http://www.ibms.org/)

In addition the School of Biological Sciences has strong links to, and collaborations with, the pathology laboratories of the main teaching hospitals in the greater Dublin area including; St. James’s Hospital, Dublin (SJH), The Mater Misericordiae Hospital, Beaumont Hospital, The Adelaide and Meath, incorporating the National Children’s Hospital, (AMNCH), Tallaght and St Vincents Hospital, Dublin. The School also has links with the Rotunda Hospital, the Coombe Women’s Hospital and Our Lady’s Hospital for Sick Children, Crumlin. These teaching hospitals facilitate education and research developments by contributing specialist guest lectures, providing on-site clinical advice and mentorship for students. The School also has links with the Rotunda Hospital, the Coombe Women’s Hospital and Our Lady’s Hospital for Sick Children, Crumlin.

2. Aims and Learning outcomes

2.1. Philosophy of the programme design

A guiding philosophy in the design of the revised MSc Programme was to equip graduates with a mixture of skills which integrate scientific and specialist knowledge in biomedical science, medical laboratory management skills, general research methodology, specialist discipline knowledge and Medical Laboratory Management skills. This particular skill-mix is essential for the unique responsibilities of the senior medical and/or research scientist and provides a foundation for lifelong learning. Core modules (total 40 ECTS credits) will provide the students with training in essential transferrable skills and bring them to the cutting-edge of clinical laboratory science. The skills and knowledge acquired in these modules are applied to and challenged through critical thinking in the specialist discipline, both theoretically (i.e. the taught modules, 20 ECTS) and practically (i.e. the research project, 30 ECTS).

The overall teaching strategy is towards a student-centred approach, a strategy which will be supported with the use of blended-learning methods. Students will be able to access DIT E-learning environment, WebCourses, via the internet using login credentials supplied by DIT. Online teaching and learning activities may include completion of simulated applications for research ethics committee approval and research funding, review of peer applications, online instruction in use of statistical software, data analysis, live videocast tutorials and asynchronous online lectures. Students will also be required to engage in peer-to-peer learning and ongoing discussions using WebCourses. As there is a broad continuum of blended learning activities, the contribution of this approach to the overall delivery of the module will vary as indicated in the relevant module descriptor (See Student Handbook). In line with postgraduate education, consideration has been given to the prior knowledge and experiences which the students bring into the Programme and hence will be provided with opportunities to share their insights and best practice with colleagues thereby enriching the learning environment for all. To facilitate horizontal dissemination of this
shared knowledge and experience, group work and peer evaluations have been built into the Programme.

2.2. Overview of the curriculum

This MSc Programme comprises a total of 15 taught modules, of which each student takes 9 modules, which attract a total 60 ECTS credits and all students undertake a laboratory-based research project which attracts 30 ECTS credits. On successful completion of the modules with the accumulation of the 90 ECTS credits, the student is eligible for consideration of the award of a Masters Degree in Clinical Laboratory Science. The Programme will be offered over two years on a part-time basis. There is also the potential to offer the programme on a full-time basis over 1 calendar year.

2.3. Aims and Objectives of the M.Sc. in Clinical Laboratory Science

The broad aims of the Programme are to provide graduates with the skills and knowledge to critically evaluate cutting-edge scientific and technical developments in biomedical science and to enable them to carry out (and supervise) research and development activities. The programme also aims to provide graduates with a framework for lifelong learning and personal professional development. Taken together these skills will enable them to function effectively in a variety of laboratory settings, including hospital pathology laboratories, diagnostic research facilities and the biomedical science industry.

The objectives of the M.Sc. Programme are to provide all students with:
- a framework for lifelong learning;
- the skills necessary to critically evaluate cutting-edge scientific and technical developments;
- more in-depth understanding and knowledge in their chosen specialised discipline area;
- competence in general, technical and scientific communication;
- the skills necessary to undertake independent, hypothesis-driven scientific enquiry;
- core management skills and the ability to further develop and apply these skills;
- the ability to carry out experimental, hypothesis-driven research.

These objectives will be achieved via dedicated specialist and core-skills modules and supported via the diverse assessment strategies used across all modules.
2.4. Learning Outcomes for M.Sc. in Clinical Laboratory Science

Upon successful completion of this programme the graduate will be able to:
- prepare a concise review of specific area(s) of biomedical science and communicate this to their peers using a variety of media (P01);
- critically evaluate the scientific and medical literature (P02);
- devise a comprehensive strategy for the evaluation and implementation of a new method or technique in the laboratory, including management and financial as well as technical aspects (P03);
- apply management strategies to emergent problems in the laboratory, including strategic and day-to-day planning, finances and quality (P04);
- analyse primary data using statistically appropriate methodologies (P05);
- formulate a hypothesis and design a scientifically and statistically valid approach to test this hypothesis (P06)
- carry out a laboratory-based experimental research project to test a specific hypothesis (P07).

These outcomes are systematically and progressively supported by the learning outcomes from the core and optional modules and have been written at a level equivalent to NQF (national Framework of Qualifications) level 9. Each module, and its associated assessment(s), typically supports several of the Programme outcomes. The relationship between the Programme and module outcomes is summarised in Table 1. Note that the modules highlighted in **Blue** are compulsory while those highlighted in **Green/Red** are specialist modular options, from which students are entitled to select two. An alignment of the programme outcomes with Knowledge, Intellectual qualities, Professional skills and Transferrable skills is shown in the bottom panel in Table 1.
Table 1 Mapping of Programme outcomes with modules and the NQF (NQAI) knowledge

<table>
<thead>
<tr>
<th>Alignment of Modules with Programme Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO1 PO2 PO3 PO4 PO5 PO6 PO7</td>
</tr>
<tr>
<td>Medical Laboratory Management 1: Management And Quality</td>
</tr>
<tr>
<td>Cell Biology and Immunology</td>
</tr>
<tr>
<td>Advanced Diagnostics</td>
</tr>
<tr>
<td>Point of Care Testing</td>
</tr>
<tr>
<td>Research Methods and Biostatistics</td>
</tr>
<tr>
<td>Medical Laboratory Management 2: Operations/Processes</td>
</tr>
<tr>
<td>Bioinformatics and Data Analysis</td>
</tr>
<tr>
<td>Advances in Cellular Pathology and Clinical Cytology</td>
</tr>
<tr>
<td>Haemostasis</td>
</tr>
<tr>
<td>Microbial Pathogenicity and Diagnostics</td>
</tr>
<tr>
<td>Clinical Immunology</td>
</tr>
<tr>
<td>Haematological Neoplasms and Lymphoma</td>
</tr>
<tr>
<td>Advanced Topics in Clinical Chemistry</td>
</tr>
<tr>
<td>Healthcare associated infection and antimicrobial resistance</td>
</tr>
<tr>
<td>Transfusion Science and Transplantation</td>
</tr>
<tr>
<td>Laboratory Research Project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alignment with NQAI Knowledge Framework &amp; Programme Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO1 PO2 PO3 PO4 PO5 PO6 PO7</td>
</tr>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td>Intellectual Qualities</td>
</tr>
<tr>
<td>Professional Skills</td>
</tr>
<tr>
<td>Transferrable</td>
</tr>
</tbody>
</table>

2.5. Alignment of Modular Options with Specialist Disciplines

Traditionally there have been six specialist disciplines in the practice of Biomedical Science: Cellular Pathology, Clinical Chemistry, Clinical Immunology, Haematology, Medical Microbiology and Transfusion Science. The flexible nature of the Programme allows individual students to tailor optional content to meet their specific specialist discipline requirements. Certain modules have been developed to align with specialist discipline requirements in response to the needs of the biomedical science profession. Table 2 provides an exemplar of the alignment of the modular options with the traditional specialist disciplines from which students can choose.
3. Programme Structure and Delivery

3.1. Programme Structure

The MSc in Clinical Laboratory Science is a fully modularized programme offered on a two year part-time basis (Figure 1). The MSc Programme consists of nine taught modules for each individual student and an experimental research project. Seven of these modules are founded on core topics areas (in Blue) designed to develop knowledge and understanding in the molecular basis and laboratory diagnosis of human disease, laboratory management and to equip graduates with essential transferable skills for scientific and professional development within a medical science laboratory setting. The remaining two taught modules are selected from a panel of modules which address multidisciplinary specialist themes in Biomedical Science as shown in Table 3. Students will select one optional module from four in each year of the Programme as highlighted in Figure 1. Each coloured block indicates either a core module or modular option where specialist content is delivered, Blue represents core modules and Green/Red represents modular options. The specialist modules are selected from a panel of modular options which allows a student to customize the Programme to meet their specific individual requirements. In the 2017-2019 cycle, for example, a student may choose one of four specialist modules as follows; 1. Clinical Immunology, 2. Microbial Pathogenicity and
Diagnostics, 3. Advances in Cellular Pathology and Clinical Cytology or 4. Haemostasis as shown in green in Table 3.

In addition, students will be required to undertake a laboratory-based research project in a specialist discipline of their choice. This is a critical part of the MSc Programme and accounts for one third of the overall teaching and learning activities and accumulates 30ECTS.

Table 3 MSc Clinical Laboratory Science Modules: Core and Optional

<table>
<thead>
<tr>
<th>Module Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Modules</strong></td>
</tr>
<tr>
<td>C1 Research Methods and Biostatistics</td>
</tr>
<tr>
<td>C2 Cell Biology and Immunology</td>
</tr>
<tr>
<td>C3 Advanced Diagnostics</td>
</tr>
<tr>
<td>C4 Laboratory Management 1:Management and Quality</td>
</tr>
<tr>
<td>C5 Laboratory Management 2:Operations/Processes</td>
</tr>
<tr>
<td>C6 Point Of Care Testing POCT</td>
</tr>
<tr>
<td>C7 Bioinformatics and data analysis</td>
</tr>
<tr>
<td><strong>Modular option Year 1</strong></td>
</tr>
<tr>
<td>M1 Clinical Immunology</td>
</tr>
<tr>
<td>M2 Microbial Pathogenicity and Diagnostics</td>
</tr>
<tr>
<td>M3 Advances in Cellular Pathology and Clinical Cytology</td>
</tr>
<tr>
<td>M4 Haemostasis</td>
</tr>
<tr>
<td><strong>Modular option Year 2</strong></td>
</tr>
<tr>
<td>M5 Haematological Neoplasms and Lymphoma</td>
</tr>
<tr>
<td>M6 Advanced Clinical Chemistry</td>
</tr>
<tr>
<td>M7 Transfusion Science and Transplantation</td>
</tr>
<tr>
<td>M8 Healthcare associated infection and antimicrobial resistance</td>
</tr>
<tr>
<td><strong>Research project</strong></td>
</tr>
<tr>
<td>L Laboratory Research Project</td>
</tr>
</tbody>
</table>
3.2. The European credit transfer system (ECTS)

The European credit transfer system (ECTS) was developed by the Commission of the European Communities to provide common procedures to facilitate academic recognition of studies abroad. The system makes it easier for institutions to recognise the learning achievements of students by using commonly understood measurements, credits and grades and it also provides a means to interpret national systems of higher education. ECTS is a credit system based on student workload where the credits reflect the quantity of work in relation to the total quantity of work necessary to complete a full year of academic study at the institution (e.g. lectures, practical work, seminars, tutorials, field work, private study and examinations and other assessments). Sixty ECTS credits represents the workload of a full academic year. Ninety credits represent the workload of a full masters degree.

3.3. Module Delivery

In the part-time format the MSc. in Clinical Laboratory Science is delivered over a period of two academic years. Five of the core modules, accounting for a total of 27.5 ECTS, and one modular option, accounting for 10 ECTS, are delivered during the first academic year. The remaining two
core modules, accounting for a total of 12.5 ECTS and one modular option, accounting for 10 ECTS are delivered during the second academic year. Thus the ECTS and examination commitment is reduced in Year 2 to facilitate time for students to work on the Research Project. The specialist modules (10 ECTS each) in the modular option panels highlighted in Figure 1 will be run over a two year cycle to ensure the generation of sufficient student demand through collective student numbers from the first and second year MSc class groups.

The first year semester one core module of the programme, Laboratory Management 1, Management and Quality, is delivered using a blended learning approach. In this module students will receive a two-and-a-half day face-to-face induction session at the DIT where they will be trained in the use of Blackboard and the essential skills to fully benefit from a blended approach. Following this initial session, the remaining teaching and learning activities will take place online. The other semester one core module, Cell Biology and Immunology, will be delivered in a day release format (one day per week) for a total of six weeks.

In the second semester, the Research Methods & Biostatistics blended learning module will be delivered both on-line via synchronous and asynchronous lectures as well as face to face one day per week for 5 weeks. The remaining first year core modules, Point of Care and Advanced Diagnostics, will be delivered as full-time block release modules over one week each. The indicative timetable for each module is presented in Section 9.1 of the Student handbook and highlights the delivery schedule for these year one core modules.

Similar to year one, the first core module of the year two Programme, Medical Laboratory Management 2: Operations/Processes, will be offered using a blended learning format similar to that described above. The remaining core module Bioinformatics and Data Analysis is delivered using a hybrid system combining a five week, single day release format (one day/week) followed by a two day college-based consolidation session.

The two modular options in the MSc Programme are delivered in a one week block release format, with full time college-based tuition which is a distinguishing feature of the Programme. In the 2017-2019 student cycle, specialist modules from modular option panel 1 will be delivered in year one of the Programme, with specialist modules from modular options 2 scheduled for year two (see Figure 1). The laboratory-based research project of the M.Sc. Programme commences in line with the Research Methods and Biostatistics Module in year one. It continues thereafter throughout the remainder of the M.Sc. Programme.

4. Admissions

4.1. Admissions Requirements

Applications for the MSc Clinical Laboratory Science Programme will be administered via the online postgraduate application system of the DIT. The Programme will only accept online applications. Review and selection of applicants will take place according to the agreed admissions procedure (see section 4.2). Final decisions will be communicated to the applicants via the Postgraduate Admissions Office of the DIT.
Entry to the MSc Programme will be based on competitive selection, and applicants who have primary degrees in the broad area of biomedical science will be considered, with the minimum requirement for entry being a second-class grade honours degree. Individuals who are eligible for membership of the ACSLM or hold Part I/Part II Fellowship of the IBMS are also entitled to apply. The admissions sub-committee will evaluate qualifications that are recognised as equivalent to the above on a case-by-case basis. Applicants to the Programme may be required to attend an interview as part of the selection process.

Students enrolled on the MSc Programme must complete a laboratory-based research project. It is the responsibility of the student to secure access to suitable facilities, support and academic supervision for the completion of this project. The DIT will not be responsible for the provision of project facilities. The Programme Committee may, however, be able to assist students in accessing suitable facilities. Applications to the course will be submitted according to the guidelines below and reviewed by the admissions sub-committee, see section 4.3.

4.2. Intake policy and recruitment procedures

All applicants for the MSc in Clinical Laboratory Science are required to hold an appropriate honours degree in Biomedical Science or equivalent or hold Part I/Part II Fellowship Examination of the IBMS. In addition, students have to be employed in an appropriate post in a suitable medical laboratory and are required to have access to facilities necessary to undertake a research project.

On this basis, approximately twenty to thirty students are allocated places in the part-time MSc Programme each year. Where demand for the Programme exceeded the number of places, students are selected using a points system based on the grade and the suitability of their qualifications and postgraduate work experience (see Table 4 Points System for MSc Application). In addition, if all other factors were equal, a previous application to the Programme is also considered in the student's favour. Despite not being extensively marketed outside the target group of medical scientists working in the Republic of Ireland, applications for the MSc in Clinical Laboratory Science have been received from a broader range of potential students including Irish, EU and non-EU students.
Table 4 Points System for MSc Application

<table>
<thead>
<tr>
<th>Points Awarded</th>
<th>Academic Qualification</th>
<th>Postgraduate Work experience</th>
<th>Previous Application to the MSc Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Honours Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st honours</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:1 honours</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:2 honours</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate Diploma</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part One Fellowship Examination</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate Work experience</td>
<td>5</td>
<td>Four years</td>
<td>4</td>
</tr>
<tr>
<td>More than Five years</td>
<td>5</td>
<td>Three years</td>
<td>3</td>
</tr>
<tr>
<td>Four years</td>
<td>4</td>
<td>Two years</td>
<td>2</td>
</tr>
</tbody>
</table>

The MSc Programme has always attracted a high calibre of students with third level qualifications.

As part of the standardised selection process all applicants to the Programme are scored on a scale of 1-5 under each of the following headings: academic qualifications, professional experience, and research experience. The highest scoring students have first right of refusal for places on the Programme.

4.3. Membership of the Admissions Sub-committee (ex officio)

Programme Chair – Mr F. Mc Grath
Year 2 Tutor – Dr. Fergus Ryan
Year 1 Tutor – Dr. Helen Lambkin
Biomedical Science tutors

4.4. International (non-EU) applicants

Applications from international students who are suitably qualified (e.g. are eligible to apply for membership of the ACSLM or IBMS) and are proficient in spoken and written English will be considered. Applicants may be required to present themselves for an interview as part of the selection process. Non-EU students must meet the English language requirements as listed below in Section 4.5.
4.5. Language Policy on Admission

The language of instruction and communication is English. All applicants whose first language is not English and who have not been educated through the medium of English will be required to meet the following requirements:

- An IELTS overall score of 6.5 or better with minimum subject scores of 6.0 for each section

Or

- an equivalent English language proficiency test.

Further details for international students are available at the following website: www.dit.ie/international

4.6. Recognition of Prior Learning

Recognition of prior learning is in accordance with the regulations of the DIT. (see http://www.dit.ie/academicaffairsandregistrar/recognitionofpriorlearning/). The admissions sub-committee will adjudicate any difficulties in award recognition on a case-by-case basis.

4.7. Deferral

Persons who have been offered a place on the Programme may defer entry for one year in accordance with the admissions policies of DIT. Applications for deferral should be made via DIT (see http://www.dit.ie/studentservices/registration/deferwithdraw/ for additional details). Note that students who defer a post-graduate Programme are not eligible for a refund of fees.

4.8. Equal Opportunities

The Dublin Institute of Technology is committed to a policy of equal opportunity in education and to ensuring that students with a disability have as complete and equitable access to all facets of college life as can reasonably be provided. The Equal Status Act 2000-2004 makes provision for a service provider, such as DIT, to prepare and implement a code of practice setting out what it is doing to promote the inclusion of students with disabilities.


4.9. Registration

Students register at the DIT on an annual basis for each year of the Programme during the normal registration period. Information regarding the annual registration process is provided at http://www.dit.ie/studentservices/registration/. Once registered students may avail of the services and facilities of the DIT. Students may register with the Disability Support Service in DIT for support with respect to modules, assessments and examinations.
5. Assessment

5.1. Strategies

Assessment strategies have been designed to evaluate the learning outcomes and enhance the transferrable skill development in the context of other teaching and learning activities (e.g. both presentation skills and scientific knowledge can be assessed during oral presentations). This approach is intended to reinforce core skill development by providing the students with opportunities to apply these skills in new contexts throughout the Programme and by permitting student feedback to be incorporated, for example during presentations.

The assessment methodologies for the Programme are varied and include:
- Devise a strategy to establish and validate an assay for an emerging biomarker;
- Literature review or dissertation;
- Oral and poster presentation (e.g. of Workplace scenario/case study);
- Practical data analysis and interpretation;
- Preparation of an application to an institutional research ethics committee or funding body, and evaluation of that of a fellow student;
- Preparation of a lay summary of a current scientific article;
- Workplace audit
- Workplace case study
- Preparation of a research-based thesis
- Preparation of a manuscript based on the research-based thesis in a format suitable for submission to a peer-reviewed journal.

The research project is a major Programme component which provides an opportunity for the students to integrate all of their scientific and core skills and knowledge in the performance of a hypothesis-driven research project. To prepare student for future scientific work and communication, this requirement to submit the project in manuscript format in preparation for submission to a peer reviewed journal is an import part of the project and accounts for 50% of the marks available.

All written assignments are uploaded to the Blackboard system in advance of the submission deadline. A plagiarism detection facility is also available for review of all submitted work and may be used to check a student’s work for plagiarism. Case presentations, typically as oral PowerPoint presentations, are used in the assessment of modular options to promote scientific communication and peer learning. Indicative guidelines for the recommended structure, content, delivery and grading of each assignment will be provided for each module.

Although all core modules are assessed by continuous assessment and assignment only, all modular options are assessed using a traditional written examination format [Modules selected from option 1 or 2]. Please see the relevant module descriptors for specific assessment details (Student Handbook).
Students are also required to sit a viva-voce examination with an External Examiner appointed by DIT. The purpose of this viva is to allow an independent assessment of the overall grade assigned to a student. It also affords students an opportunity to discuss and where necessary, defend their research project.

5.2. Assessment Marks and Standards

Regulations for the Conduct of Assessments
All assessments conducted on this Programme are subject to the General Assessment Regulations of DIT http://www.dit.ie/qualityassuranceandacademicProgrammeregisters/student-assessment-regulations/general/

5.3. Approaches to Student Assessment

The assessment approaches used in the Programme, together with the structure and rubric for those modules using unseen written examinations are shown in Table 5.

Assessment of each module normally comprises formative assessment conducted during the delivery of the module (continuous assessment) and/or summative assessment (written examination) conducted at the end of the semester in which delivery of the module is completed unless otherwise specified.
### Table 5 Module Assessment Strategies

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Semester/ Year</th>
<th>Marks</th>
<th>Teaching &amp; Learning Activities (Hours)</th>
<th>ECTS Credits</th>
<th>Assessment Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Medical Laboratory Management 1: Management and Quality.</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>150</td>
<td>10 15 125 150</td>
<td>7.5</td>
<td>FTASS: Theory Based Assessment, &amp; Work-based Scenarios</td>
</tr>
<tr>
<td>2. Cell Biology and Immunology</td>
<td>BIOL9227</td>
<td>S1/Y1</td>
<td>100</td>
<td>30 0 70 100</td>
<td>5</td>
<td>FTASS: Critical review &amp; Peer-seminars</td>
</tr>
<tr>
<td>3. Advanced Diagnostics</td>
<td>BIOL9XXX</td>
<td>S2/Y1</td>
<td>100</td>
<td>25 0 75 100</td>
<td>5</td>
<td>FTASS: Device strategy; Case Presentation Data analysis &amp; Research application: Presentation</td>
</tr>
<tr>
<td>4. Point of Care Testing</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>100</td>
<td>15 0 85 100</td>
<td>5</td>
<td>FTASS: Workplace Audit/Scenario &amp; Peer seminars</td>
</tr>
<tr>
<td>5. Research Methods and Biostatistics</td>
<td>BIOL9231</td>
<td>S2/Y1</td>
<td>100</td>
<td>25 0 75 100</td>
<td>5</td>
<td>FTASS: Critical review and Project Pr</td>
</tr>
<tr>
<td>6. Medical Laboratory Management 2: Operations/Processes</td>
<td>BIOL9XXX</td>
<td>S1-2/Y2</td>
<td>150</td>
<td>10 15 126 150</td>
<td>7.5</td>
<td>FTASS: Case study, Peer assessment</td>
</tr>
<tr>
<td>7. Bioinformatics and Data Analysis</td>
<td>BIOL9XXX</td>
<td>S2/Y2</td>
<td>100</td>
<td>25 0 75 100</td>
<td>5</td>
<td>FTASS: Bioinformatics &amp; Data analysis reports on Project</td>
</tr>
<tr>
<td>8. Advances in Cellular Pathology and Clinical Cytology</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>200</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>9. Haemostasis</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>100</td>
<td>20 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>10. Microbial Pathogenicity and Diagnostics</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>100</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>11. Clinical Immunology</td>
<td>BIOL9XXX</td>
<td>S1/Y1</td>
<td>100</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>12. Haematological Neoplasms and Lymphoma</td>
<td>BIOL9XXX</td>
<td>S1/Y2</td>
<td>100</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>13. Advanced Topics in Clinical Chemistry</td>
<td>BIOL9XXX</td>
<td>S1/Y2</td>
<td>100</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>14. Healthcare associated infection and antimicrobial resistance</td>
<td>BIOL9XXX</td>
<td>S1/Y2</td>
<td>100</td>
<td>25 0 175 200</td>
<td>10</td>
<td>FTASS: 1. Oral Presentation, 2. Written Assignment Summative Assessment</td>
</tr>
<tr>
<td>15. Transfusion Science and Transplantation</td>
<td>BIOL9236</td>
<td>Y1-Y2</td>
<td>600</td>
<td>0 50 550 600</td>
<td>30</td>
<td>Process Document &amp; Manuscript</td>
</tr>
</tbody>
</table>

Legend for Table 5: FTFL: Face-to-Face learning activities i.e. contact hours (including lectures, workshops, demonstrations); OLA: Online learning activities (including synchronous and asynchronous contact); SD: Student directed activities (including group work, online discussion etc.); FTASS: Formative Theory Assessment
5.4. Standardised performance descriptors

All module assessments will be graded in accordance with the performance descriptors highlighted in Table 6 Standardized Performance Descriptors for Module Assessment. The pass mark for all modules in this Programme is 50%. It is essential that students understand the expectations with regards to the quality of material submitted for assessment and marking. As this is a graded MSc award, it is also important that students are aware of the precise performance indicators associated with each grade.

To be eligible for consideration of an MSc award with distinction, they must receive 70% or higher for both the project and the weighted mean for the eight taught modules.

<table>
<thead>
<tr>
<th>%</th>
<th>Performance Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>70+</td>
<td>Excellent performance, engages closely and systematically with question set, with consistently strong evidence of comprehensive mastery of the subject matter, very well supported by evidence &amp; relevant citation excellent ability to organise, analyse &amp; express arguments fluently and lucidly; very high level of critical analysis; well developed capacity for creative &amp; logical thought</td>
</tr>
<tr>
<td>60–69</td>
<td>Very good performance, engages substantially with question as demonstrated by a strong grasp of subject matter which is well supported by current evidence and appropriate citation; well-developed capacity to analyse, organise and present arguments clearly and effectively; capable of some original insight and logical thought</td>
</tr>
<tr>
<td>50–59</td>
<td>Good performance, demonstrates grasp of the subject but ideas may not be fully developed or fully supported by evidence and citation; writing adequate but short of fluency with omission of aspects of topic or minor errors; average critical awareness and analytical qualities; limited evidence of capacity for original and logical thought</td>
</tr>
<tr>
<td>45–49*</td>
<td>Unsatisfactory performance, demonstrates some familiarity with topic, but only basic grasp of subject matter; lacks focus and structure; coverage of main points but lack of fine detail; limited effort to engage and critically analyse</td>
</tr>
</tbody>
</table>

Assessment of each specialist modular option is by unseen written examination. These two examinations will be sat in the first available examination session following completion of the module.
The examination for modular option 1 will be held at the end of the semester one examination. Similarly the examinations for modular option 2 will be held during the sessional examination session at the end of Semester 1 in the second year. Table 7 represents an indicative schedule of assessments for the 2017-2019 student cycle. The exact dates of these examinations will be decided in consultation with the Examinations office at the DIT and every effort will be made to ensure that these are as late as possible in the examination sessions. Each student will be provided with sample papers for these examinations. The *viva-voce* will be conducted by the relevant external examiner and will be held following submission of the research project thesis and scientific manuscript. Full details of DIT examination regulations are available at [http://www.dit.ie/qualityassuranceandacademicProgrammerecords/student-assessment-regulations/general/](http://www.dit.ie/qualityassuranceandacademicProgrammerecords/student-assessment-regulations/general/).

Table 7 Provisional schedule of assessments 2017-2019

<table>
<thead>
<tr>
<th>Semester</th>
<th>Module title</th>
<th>Indicative due date*</th>
<th>Assessment activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Laboratory Management 1</td>
<td>27/09/2017</td>
<td>Theory assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11/10/2017</td>
<td>Peer assessment of workplace scenarios</td>
</tr>
<tr>
<td></td>
<td></td>
<td>08/12/2017</td>
<td>Case study</td>
</tr>
<tr>
<td>S1</td>
<td>Cell Biology &amp; Immunology</td>
<td>09/11/2017</td>
<td>Critical review of a journal article</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16/11/2017</td>
<td>Peer-seminars</td>
</tr>
<tr>
<td>S1</td>
<td>Modular Option 1</td>
<td>24/11/2017 or 1/12/2017</td>
<td>Oral Presentation on 1 day of block</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Written Workplace Scenario/Case Study</td>
</tr>
<tr>
<td>S1</td>
<td>Jan 2018</td>
<td></td>
<td>Written Examination – Modular Option 1</td>
</tr>
<tr>
<td>S2</td>
<td>Advanced Diagnostics</td>
<td>26/01/2018</td>
<td>Oral Presentation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>02/03/2018</td>
<td>Devise and submit strategy for a biomarker validation</td>
</tr>
<tr>
<td>S2</td>
<td>Research Methods</td>
<td>27/09/2017</td>
<td>Theory assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11/10/2017</td>
<td>Data analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>08/12/2017</td>
<td>Research application</td>
</tr>
<tr>
<td>S2</td>
<td>Point of Care testing</td>
<td>13/4/2018</td>
<td>Oral Presentation on 1 day of block</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Written Workplace Scenario/Case Study</td>
</tr>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>Laboratory Management 2</td>
<td>28/09/2018</td>
<td>Theory assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12/10/2018</td>
<td>Peer assessment of workplace scenarios</td>
</tr>
<tr>
<td></td>
<td></td>
<td>09/12/2018</td>
<td>Case study</td>
</tr>
<tr>
<td>S2</td>
<td>Modular Option 2</td>
<td>23/11/2018 or 30/11/2018</td>
<td>Oral Presentation on 1 day of block</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Written Workplace Scenario/Case Study</td>
</tr>
<tr>
<td>S1</td>
<td>Jan 2019</td>
<td></td>
<td>Written Examination – Modular Option 2</td>
</tr>
<tr>
<td>S2</td>
<td>Bioinformatics and Data Analysis</td>
<td>23/02/2019 or 02/02/2019</td>
<td>Bioinformatics Project report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data Analysis Project report</td>
</tr>
<tr>
<td>Ongoing</td>
<td>Research Project</td>
<td>11/05/19</td>
<td>Manuscript submission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25/05/19</td>
<td>Thesis submission</td>
</tr>
<tr>
<td>S2</td>
<td>Viva voce</td>
<td>June 2019</td>
<td>Oral examination</td>
</tr>
</tbody>
</table>
5.5. Modules Assessed through Continuous Assessment only

Students will submit all written continuous assessments electronically, and WebCourses will act as a store of these components during the period of a student's enrolment on the Programme. In the case of oral presentations copies of the slides will also be submitted electronically.

Where continuous assessment comprises two or more components the weighting between these components, along with thresholds will be specified and documented in the Student Handbook and module descriptors that are made available to students at the commencement of the Programme. The module cannot be passed if any of these continuous assessment components returns a mark of less than 45%. When the continuous assessment consists of two or more components, a candidate must achieve a mark of 50% of the maximum marks available for the overall continuous assessment.

A candidate who has achieved a minimum mark of at least 45% in one or more component of the continuous assessment is within the compensation range and is permitted to pass the continuous assessment provided the overall mark for the continuous assessment is at least 50% of the maximum marks available. In computing the overall mark for the continuous assessment, the weighting between the various components that comprise the continuous assessment must be taken into account.

5.6. Resubmission of Continuous Assessment Component(s)

A candidate who has failed continuous assessment component(s) will be offered a single opportunity to repeat and/or resubmit the failed component(s) prior to the Module Board, i.e. before the completion of the module. The candidate will be awarded a maximum mark of 50% for a continuous assessment component passed in this manner, and this mark of 50% will be recorded in academic history and used in calculating the overall module assessment mark. This facility to resubmit a continuous assessment component prior to the Module Board which will be held after completion of the module can only be applied to a maximum of three individual continuous assessment components over the course of the Programme.

5.7. Combined Continuous and summative assessment

To pass a module assessed by a combination of continuous and summative assessment a candidate must attain 50% of the total marks available for the module and must attain at least 45% of the marks available in the summative and continuous components of the assessment. In computing the overall mark of the module the weighting between continuous and summative components of the assessment must be taken into account.

In the case of summative assessment students will be required to sit a total of two examination papers in their Modular Options: one will be held at the end of semester one of year one and two.

A candidate who has achieved a minimum mark of at least 45% in either the continuous assessment or the summative assessment components is within the compensation range and is
permitted to pass the module provided the overall computed mark for the module is at least 50% of the maximum marks available. When computing the overall mark of the module the weighting between continuous and summative components of the assessment must be taken into account.

When the continuous assessment consists of two or more components, a candidate must achieve a mark of at least 45% in each of the components. The weighting between the continuous assessment components must be taken into account in calculating the overall mark for the continuous assessment. The computed final mark for the module must be at least 50% of the maximum marks available to pass the module.

5.8. Internal Moderation

This programme has internal moderation systems in place to assure the consistency of marking and the proper application of the marking criteria across modules.

Internal moderation may include, but is not limited to:

a) Checks to ensure that marking is comparable across marking pairs or teams
b) Checks to ensure that marking is comparable across different options and electives

Where the internal moderation process identifies substantial discrepancies, third-marking of a set of assessments may be required.

5.9. Breaches of Assessment Regulations

Details of all procedures relating to an allegation of breaches of assessment regulations can be found in the DIT General Assessment Regulations (second edition) June 2009 (revised March 2015). See (http://www.dit.ie/qualityassuranceandacademicProgrammerecords/student-assessment-regulations/general/) An enquiry into the circumstances relating to an allegation of breaches of the assessment regulations shall be conducted at College level by a Panel of Enquiry.

5.10. Appeals, Remarks and Re-checks

The grounds for remarks, re-checks and appeal against the decision of a Progression and Award Board are specified in the DIT General Assessment Regulations (second edition) June 2009 (revised March 2015). All requests for re-checks and appeals against the decisions of Progression and Award boards will be conducted in accordance with the procedures specified in section 14 of DIT General Assessment Regulations (second edition) June 2009 [amended by Academic Council May 2011].

5.11. Personal Circumstances

All matters relating to personal circumstances or mitigating circumstances will be handled according to the procedures specified in section 13 of the DIT General Assessment Regulations (second edition) June 2009 (revised March 2015).
5.12. Student Grievance procedures for Programme Related Matters

If a student has a problem with any aspect of the Programme the procedure is as follows:

a) The issue is brought to the attention of the lecturer involved

b) If a student is not satisfied with the response of the lecturer the issue should be brought to the attention of the year co-ordinator who will discuss the matter with the Programme Director. The student will receive written [email] and verbal feedback. The lecturer involved will also be included in the discussions so that the issue is resolved to the satisfaction of both parties. The year Co-ordinator and Programme Director may refer the student to one or a number of the support services if appropriate.

c) If there is a serious issue requiring further discussion or evaluation it will be referred to the Head of School of Biological Sciences or the student may elect to follow the formal DIT procedures.

6. Project Guidelines

This section provides an overview of the structure, management and assessment of the laboratory research project. It also outlines your role in the project and the expectations of your primary supervisor. Note that this section presents an overview only – for detailed advice and information on scientific writing and data presentation please consult Blackboard.

6.1. Project Overview

The project is a substantial body of experimental work, based on a hypothesis and research plan developed during the ‘Research Methods and Biostatistics’ (BIOL 9XXX) module. The aim of the project is to complete scientifically valid work which allows you to prove or refute your hypothesis. This approach means that your project will address a valid, clinically significant question and may be suitable for publication in a peer-reviewed journal.

6.2. Project Proposal

The test hypothesis and the experimental plan of the laboratory project will be developed during the ‘Research Methods and Biostatistics’ module using a structured approach where you will be required to simulate a research grant application which will include aspects such background, research hypothesis, a detailed experimental plan, project costing and evidence of ethical approval. You will develop a project proposal in collaboration with an on-site supervisor, who should be a senior or chief medical scientist, Fellow of the IBMS, ACSLM or RCPath, or a consultant physician in a cognisant specialist area.

The finalised project ‘applications’ prepared during this module will be submitted to the Programme Committee which will convene an interdisciplinary panel of academic staff and screen the proposals for suitability. If the project is deemed to be suitable the Programme Committee will approve your project and the experimental work may commence. Note that although the project should only commence following ‘Research Methods and Biostatistics’ module, it is important to realise that it may take a considerable time to obtain approval from a Research Ethics Committee and that this should be sought as soon as possible – in fact it is a great advantage to have ethics approval organised at an early stage.
6.3. Project Management

The project will be managed by a team consisting of an on-site supervisor (considered to be the primary supervisor) and an academic supervisor based at the DIT. Primary responsibility for project design and execution will rest with you in cooperation with your on-site supervisor. The academic supervisor typically acts in an advisory or consultative capacity, rather than directing the project, unless a specific request is made to the Programme Committee. In the occasional situation where a local supervisor cannot be appointed, an additional academic supervisor will be appointed to fulfill the role of the primary supervisor. As the project starts in Semester two of year one, there is a total of 12-14 months for project activity, with a deadline for submission of the written assessments in the middle of Semester two of Year two. These deadlines will be strictly enforced.

You will be required to submit regular formal progress reports directly to the academic supervisor. These progress reports are designed to identify impediments to the project at an early stage and are not intended to be intrusive or restrictive. There are no marks associated with these progress reports.

6.4. Roles and Expectations

Your commitment to the laboratory-based research project is a necessity for its successful completion. However, as a student you typically cannot manage everything on your own. Your supervisor has a key role to play in enabling you to succeed, principally by facilitating you to develop the skills and know-how to allow you to complete the project and by troubleshooting both laboratory and administrative issues. This type of mentorship depends on a close working relationship between you and your supervisor. Your on-site supervisor will receive a handbook outlining the supervisors role upon agreeing to supervise the project. This will be arranged following the Research Methods and Biostatistics module.

You will be expected to commit a substantial amount of time to the project, something in the region of 550-650 hours of work. Effective time management will be critical to the success of your project. You will need to maintain accurate records of methods and data, comply with health and safety legislation and local ethics guidelines, perform the experiments, interpret the data and prepare the two written reports (thesis and manuscript). This is a large commitment and your supervisor will help you to manage this body of work.

Please note that the primary responsibility for project design and execution will rest with the student and the on-site supervisor, with the academic supervisor typically acting in an advisory or consultative capacity, rather than directing the project unless a specific request is made to the Programme committee. In the occasional situation where a local supervisor cannot be appointed, an additional internal academic supervisor will be appointed to fulfil the role of the primary supervisor.
6.5. Project Assessment

The project will be assessed by two complimentary methods – you will present the results in a thesis format and also in the form of a scientific manuscript suitable for publication in one of the major journals in your field. Each of these components is worth 50% of the available marks for the module. The following performance descriptors will apply to both of these written components with particular emphasis on your ability to maintain and manage detailed records of your primary data and your ability to prepare, summarise and present research findings.

6.6. Thesis Preparation Guidelines

You should familiarise yourself with the thesis regulations and guidelines set out by the Graduate Research School of the DIT (available at http://www.dit.ie/study/postgraduate-office/policiesandprocedures/regin/). Thesis templates and style filters suitable for reference managing Programmes will be available via Webcourses. The structural key points are summarised below:

- The body of the thesis should be printed single-sided on good quality white A4 size paper using 12 point, black type face and double line spacing. On each page there should be a left-hand margin of at least 40 mm and a right-hand margin of at least 20 mm.
- All pages should be numbered consecutively throughout the text and appendices, starting at the table of contents, with the page numbers central at the bottom of each page, at least 10 mm above the edge of the page.
- A thesis may include work already published by the candidate if this work was performed during the student’s period of registration for higher degree.
- A thesis must be written concisely. There is no minimum length for a thesis submitted as part of a master’s Programme. Typically a thesis is 60-75 pages in length.
- The hard cover is required to be dark blue in colour and the front cover must be gold-embossed with the following:
  - the full title of the thesis (in 20 point type) together with any subtitles
  - the name of the candidate
  - the award for which the thesis is submitted
  - the name of the Institute
  - the year of submission
- The spine of the hard-bound cover thesis is also required to be gold-embossed, in a smaller type if necessary, with the following:
  - the name of the candidate
  - the award (in abbreviated form) for which the thesis is submitted (PgDip (Res), MPhil, PhD)
  - the year of submission
A page containing the following declaration, appropriately completed is required:

I certify that this thesis which I now submit for examination for the award of ______________, is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been cited and acknowledged within the text of my work.

This thesis was prepared according to the regulations for postgraduate study by research of the Dublin Institute of Technology and has not been submitted in whole or in part for another award in any Institute.

The work reported on in this thesis conforms to the principles and requirements of the Institutes’ guidelines for ethics in research.

The Institute has permission to keep, lend or copy this thesis in whole or in part, on condition that any such use of the material of the thesis be duly acknowledged.

Candidate Signature ___________________ Date ______________

The thesis should be structured according to the following scheme:

- Abstract
- Declaration Page
- Acknowledgements (if any)
- Abbreviations list
- Table of contents
- Table of illustrations, figures, etc.
- Ethical Approval statement
- Introduction
- Materials and Methods
- Results
- Discussion
- References/bibliography
- Appendix
- List of publications (if any)

All text in the thesis must be fully referenced, using appropriate scientific sources. All references cited within the text should be identified using the author-name, year system. The list of bibliography should appear in alphabetic order. Full details of the recommended ‘DIT Harvard’ in-text citation and bibliography referencing format will be provided. It is recommended that you use a reference management software to manage your references.

6.7. Manuscript Preparation Guidelines

As the goal is to prepare a manuscript suitable for publication in a peer-reviewed journal the guidelines for the preparation are identical to that of an academic journal. In consultation with your DIT academic supervisor and project supervisor, a journal appropriate to the project will be chosen. The manuscript, prepared using the author instructions and guidelines for the chosen
journal, should be submitted 2 weeks prior to the submission of the thesis. Further details will be available via Webcourses.

7. Progression and Award

7.1. Progression from Year 1 to Year 2

Decisions on student progression at the end of year one will be made by the Programme Progression and Award Board which will meet at the end of semester two (June annually). The Programme Progression and Award Board will review the performance of candidates in all modules completed during the first year of the Programme.

(a) For each of the modules comprising year one of the Programme students who (i) have achieved a pass mark (50%) or better and (ii) who have complied with all threshold requirements for assessment components shall be eligible to progress to year 2;
(b) No compensation between modules will be permitted to condone failure in a module(s);
(c) Students will not be able to carry a failed module from Year 1 into year 2.
(d) A student who is unable to pass one or more modules from Year 1 of the Programme after the one permitted intra-module supplemental attempt is not permitted to progress to the MSc. These students may progress to the Postgraduate Diploma providing they retake and successfully complete the failed module(s) before commencing Year 2.
(e) Where a candidate is judged to have failed a module(s) the Programme Progression and Award Board will specify which components of the module assessment the student must resit and any other conditions that must be met, including, at the discretion of the Programme Progression and Award Board, that a student may be required to resit the entire module(s) at the next available opportunity. Students will be able to carry forward the marks for any successfully completed elements of the re-assessed module. The student will be deemed to have passed the re-assessed module if the aggregate of the marks carried forward and the marks from the re-assessment achieves the requirements for the module. The student will be awarded a maximum mark of 50% for a re-assessed module passed in this manner. This mark will be recorded in academic history, and for the purpose of calculating an overall grade any module passed in this manner shall be counted as 50%. In the case of both continuous assessment and summative assessment students will be offered three supplemental attempts.

7.2. Award of the MSc in Clinical Laboratory Science

To be eligible for consideration for the award of MSc in Clinical Laboratory Science a candidate must satisfy all the requirements of the Programme in accordance with the assessment arrangements specified in this document and comply with all appropriate regulations of the Institute:

(a) Students, who for each of the modules comprising the Programme, have (i) achieved an overall pass mark (50%) or better and (ii) who have complied with all threshold requirements for assessment components shall be eligible for consideration for award;
(b) No compensation between modules will be permitted to condone failure in a module(s);
(c) The award of degree with Distinction shall be based on (i) exceptional performance in the project and (ii) overall exceptional performance of a candidate in the taught modules where the marks awarded to each module are weighted in accordance with the ECTS credit value for the module. A total of 1200 marks are available for the nine taught modules that comprise the Programme. To be eligible for the award with Distinction a candidate must receive 70% or higher in (i) the project and (ii) weighted mean for the nine taught modules listed in Table 3. Although this is a stringent requirement for excellence, it is in line with the recommendations of the professional bodies.

(d) As an incentive and reward for high quality research delivered through the research project work and manuscript preparation, a student who has:

(i) Their manuscript accepted for publication in a peer reviewed scientific journal prior to the Programme Award Board

And

(i) Successfully passed all other modules required.

will be eligible for the award of MSc in Clinical Laboratory Science with the level of Distinction.

Where a student fails a module in year 2 of the Programme the Award Board will specify which components of the module assessment the student must resit and any other conditions that must be met as specified in Section 7.

7.3. Exit Award - Postgraduate Diploma in Clinical Laboratory Science in Year 2

To be eligible for consideration for the award of Postgraduate Diploma in Clinical Laboratory Science a candidate must satisfy all the requirements of the Programme in accordance with the assessment arrangements specified in this document and comply with all appropriate regulations of the Institute.

(a) Students who have (i) achieved a pass mark (50%) or better and (ii) who have complied with all threshold requirements for assessment components in all the taught core and modular options and who have accumulated 60 ECTS credits shall be eligible for consideration for award of the Postgraduate Diploma. A total of 1200 marks are available for the nine taught modules. The Postgraduate Diploma may be awarded at the level of Distinction once the candidate achieves an overall mean of 70% across all the taught modules.

(b) A student who is unable to pass one or more modules from Year 1 of the Programme, after the permitted supplemental attempt is not permitted to progress to the MSc. These students may progress to the Postgraduate Diploma providing they retake and successfully complete the failed modules(s) before commencing Year 2.

In addition, students who have: successfully passed all of the Year 1 modules but are unable to secure access to a suitable laboratory to complete the research project or who do not wish to
undertake the research project or for any other reason acceptable to the Programme Progression and Award Board may progress to the Postgraduate Diploma in Year 2.

A designated agreed fee will apply for year 2 on the Postgraduate Diploma register, as the student will not be required to register for the project module. The graduand who has been awarded the Postgraduate Diploma in Clinical Laboratory Science is not eligible to re-register on the Programme in the future for the award of the Masters degree.

8. Quality Assurance Procedures

Routine monitoring of the academic quality of the established Programme will be carried out in line with the quality assurance procedures in existence in DIT (available at http://www.dit.ie/qualityassuranceandacademicProgrammeregories/student-assessment-regulations/general/) This will ensure continued adherence to excellence in academic standards. In the DIT academic content and quality is the responsibility of the Directorate of Academic Affairs.

8.1. Monitoring of the Academic Quality of the Programme

Routine monitoring of the academic quality of the established Programme will be carried out in line with quality assurance procedures in existence in the DIT. This is to ensure continued adherence to excellence in academic standards and to prevent a reputational risk to the DIT. The process is based on a combination of report processes involving external examiners, student and staff feedback as detailed below.

8.2. External Examiners

Monitoring of the quality of the Programme will be carried out via the external examiners appointed by the Academic Council of the DIT. These appointments are made at the recommendation of the Programme Committee/Head of School on submission brought to the College of Sciences and Health, College Board in DIT. The external examiners’ reports are reviewed by the School Executive and are submitted to the College of Sciences and Health Board at the DIT. These findings of these reports will be submitted to the Programme Committee for review and implementation. The functions and responsibilities of an external examiner are described in the General Assessment Regulations of DIT. (Available at http://www.dit.ie/qualityassuranceandacademicProgrammeregories/student-assessment-regulations/general/)

8.3. Recurrent reviews

The Programme will be an integral part of the recurrent review of the School of Biological Sciences which operates on a five year cycle.
8.4. Student-centred feedback process

A student-centered feedback process is in place at the DIT and is designed to evaluate the effectiveness of teaching and learning methods and to identify critical issues at an early stage. This process is based on a system of feedback provided by students to the module coordinator Form Q6A. A subsequent summary (Form Q6B) of this feedback is then provided to the Programme Director, who prepares a quality report (Q5 quality report) which also incorporates feedback from staff, and recommendations/comments from both external examiners and the Profession Liaison Committee. In addition, a Q6c is issued to students by the Quality Assurance Office, which collates student feedback on the overall programme. The Q6c data is returned to Schools and is considered by the School Executive and the Programme Committee as relevant to the Q5. The Q5 quality report must be reviewed and approved by the Programme Committee before submission to the board of the College of Sciences and Health. Details of these procedures are provided in the DIT ‘Handbook for Academic Quality Enhancement’ (see http://www.dit.ie/qualityassuranceandacademicProgrammeresords/handbook/). The annual DIT Programme reporting process (Q5 quality report) is designed to evaluate the continued effectiveness and quality of taught provision at DIT. Submission of the annual Q5 quality report approved by the Programme Committee to both the board of the College of Sciences and Health and the DIT Academic Affairs is mandatory. Actions to address shortcomings and/or further enhance the quality of the student experience will be agreed by the Programme Committee, the School Executive and the College of Sciences and Health Board, as appropriate. Issues to be addressed by the School Executive will be documented in the School Action Plan, while issues requiring an input at College level will be documented in the College Action Plan. The Programme Committee and Programme Team will directly address issues within their remit. The Q5 report together with the response of the College of Sciences and Health Board is submitted to the DIT Academic Quality Assurance committee which reports to the DIT Academic Council on all matters relating to quality assurance. In DIT academic content and quality is the responsibility of the Director of Academic Affairs.

9. Teaching

9.1. Strategy

This Programme will be delivered by the DIT using a combination of blended learning, day-release and block-release formats over the course of two academic years. In addition to this formal instruction, each student expected to engage in self-directed learning, course work, assignments, tutor interaction and project work during the remaining time. The overall teaching strategy is towards a student-centered approach, a strategy which is supported with the use of student-directed learning and a blended learning method.

Blended learning is a combination of traditional face-to-face instruction and other activities which take place online. The initial face-to-face sessions will outline the School expectations as a participant in a blended module and will provide students with basic training in Blackboard, the E-learning package used by the DIT. In the context of the current Programme, E-learning activities will include live AV broadcasts over the Internet and an associated electronic archive of lectures (via Blackboard Collaborate), availability of audio and audiovisual instruction videos (e.g. how to
use a particular software package) and online tasks (e.g. simulated grant and research ethics forms, data analysis tasks).

In the day release format students will attend lectures for one day a week while in the block release format students will attend DIT for one week of intensive instruction, followed by two days of consolidation and assessment.
Academic Staff from DIT will deliver the module content along with invited experts from the Medical Science and Clinical Medicine community. A list of DIT academic staff and relevant module contribution is detailed in Table 8.

### Table 8 DIT Staff Teaching on the Programme

<table>
<thead>
<tr>
<th>Module</th>
<th>Dr. H. Lambkin</th>
<th>Dr. J. Guerin</th>
<th>Dr. M. Hutt</th>
<th>Dr. C. Herrera</th>
<th>Dr. Claire Wyne</th>
<th>Dr. S. Lynch</th>
<th>Ms. A. Malkin</th>
<th>Dr. F. Ryan</th>
<th>Mr. F. McGraith</th>
<th>McG. Malone</th>
<th>Dr. J. Kearney</th>
<th>Dr. J. Naughton</th>
<th>Dr. S. Dillon</th>
<th>Dr. N. Gilchrist</th>
<th>Dr. D. Drudy</th>
<th>Dr. F. Clarke</th>
<th>Dr. G. Byrne</th>
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#### 9.2. Webcourses

Webcourses is the E-learning package used by the DIT, which will be available to students twenty four hours a day using a secure login system. It is an integrated online suite which permits the distribution of static content (such as announcements, lecture notes or AV recordings of lectures) and also provides a facility for interactive teaching and learning activities (such as discussion fora, live chat and assignments). One of the great advantages of the system is the ability to provide timely and direct feedback to students following submission of assignments via e-mail, audio feedback. This is particularly valuable where students are enrolled in the part-time Programme and are in full time employment. Training in how to use Webcourses will be provided during the induction sessions during the first module of the Programme, Research Methods and Biostatistics.
10. Market demand for the Programme

10.1. Laboratory Medicine Integral to Clinical Care Pathways

Laboratory medicine services are a pivotal element in the delivery of an integrated national clinical service. Over 70% of all patients accessing healthcare in either a primary or secondary care setting require a pathology investigation for clinical diagnosis and/or, treatment monitoring purposes. The ability of the Health Service Executive (HSE) to successfully complete its ongoing transformation of healthcare services will depend to a significant degree on the effectiveness and efficiency of an integrated laboratory medicine service that meets clinical need.

Medical Scientists are key decision makers in the delivery of Pathology diagnostic services for patients. Within Clinical and Laboratory Medicine, Medical Scientist lead on diagnostic services in: Cellular Pathology (Histopathology), Clinical Chemistry, Haematology, Immunology, Medical Genetics, Medical Microbiology, Molecular Diagnostics, Point-of-Care-Testing, Transfusion and Transplantation Science and Virology. They form the largest part of the workforce collaborating with and supporting Consultant doctors in the delivery of crucial services in these areas. The provision of education to Master of Science level which is allied to the evolving needs of the Biomedical Science Profession ensures that Medical Scientists have the most up-to-date knowledge and skills to be an active participant in the multi-disciplinary delivery of healthcare for the patient.

Medical Scientists in the public service number about 2,000 and represent a dynamic, efficient and agile profession which has adapted to its evolving environment. This is evidenced through a reputation for continuing professional development, research and innovation in all aspects of laboratory medicine. As the prevalence of certain diseases such as cancer and diabetes increase, the demands on the Pathology services have risen allied to the developments in personalised medicine which has led to an increase in the reliance on the knowledge, skills and competencies of Medical Scientists.

Biomedical science graduates enter a changing and challenging environment in which lifelong learning plays an essential role. Many biomedical science graduates strive for additional qualifications before or after taking up employment including Master of Science (MSc), Doctor of Philosophy, MRCPath, or professional doctorates and other postgraduate Programmes including medicine, bioinformatics and other allied health professions. As an integral component for their professional progression, a significant number of Medical Scientists complete the MSc in Clinical Laboratory Science.

10.2. National developments and areas of significant impact.

There are a number of significant developments in the pathology service nationally which impact on the service and the provision of postgraduates that meet the needs of the profession and are fit for purpose.
• The implementation of the National Cancer Strategy and the introduction of the recent National Colorectal Screening Programme have led to an increase in demand for areas such as Cytology, Histopathology and molecular diagnostics services.
• The National Medical Laboratory Information System (MedLIS). This project will replace all of the disparate laboratory systems nationally and is supported by the MedLIS and HSE national technology teams. The MedLIS project will be rolled out over the next four years and has resulted in large scale secondment of medical scientists to the project with allied expertise in information technology.
• In April 2011, The HSE’s Clinical Strategy and Programmes Directorate established a National Clinical Programme in Pathology with key objectives of implementing a National Pathology Network and a Programme for Laboratory Modernisation. This Programme aims to introduce core laboratory technology (blood sciences), regulate Point of Care testing and improve ICT connectivity.
• New Horizons - Advanced Practice and Extended Scope of Practice for Medical Scientists in Ireland (ACSLM and MLSA joint publication 2016) which looks at extended scope of practice roles in defined areas such as histopathological dissection specialists. The School of Biological Sciences in collaboration with the Faculty of Pathology, Royal College of Physicians in Ireland, and in association with the ACSLM has established the first National CPD Certificate Programme in Histopathological Dissection at level 9, focused currently on the specialist tissues of Breast and Skin which has had its first student intake in January 2016.
• The National Histopathology Quality Assurance Programme Implementations 2014\(^1\), published by the Faculty of Pathology of the Royal College of Physicians of Ireland, emphasises the crucial role that Medical Scientists play in the establishment and delivery of quality assurance Programmes.
• Molecular Diagnostics –now forms an integral part in the delivery of laboratory medicine in all disciplines. This has led to the development of stand-alone multi-disciplinary molecular diagnostics in some hospitals, or new Molecular Diagnostics Departments within individual disciplines led by Medical Scientists with postgraduate qualifications. The role for molecular diagnostics will continue to expand to meet the requirements of personalised medicine and will require Medical Scientists with the relevant expertise and skillset integrating laboratory medicine with bioinformatics.
• The development of Haemovigilance for monitoring and management of blood products and the increasing role of Infectious Disease Surveillance have led to many new positions and opportunities for progression in the pathology service.
• The provision of laboratory services has become increasingly complex due to implementation of the Blood and Tissue legislation, international standards for laboratory accreditation which are overseen by the Health Products Regulatory Authority (formerly the Irish Medicines Board) INAB and HIQA [Health Information Quality Authority]. These have led to the requirements for the establishment and management of a quality management system, audits and inspections for Pathology Services. This in turn has resulted in the creation of new positions in a specialist area of Quality for Medical Scientists with the requirement of postgraduate education directed to their specialist areas.
• On-going expansion in the services provided by private hospitals and clinics. [St.Vincents Private, Mater Private, Blackrock Clinic, Bons Secours Hospitals, Beacon Hospital,  

\(^1\) The National Histopathology Quality Assurance Programme Implementations (2014), pp.18-20
Ongoing competition from various private international pathology service providers located in Ireland, such as MedLab Pathology, Biomnis, Quest, ICON, etc.

- Regulation of the Medical Scientist Profession by CORU, the Health & Social Care Professions Regulator. Establishment of the CORU Medical Scientist Registration Board occurred in October 2016, with the first meeting of the Board on 30th November 2016. The role of CORU is to protect the public by promoting high standards of professional conduct, education, training and competence through statutory registration of health and social care professionals. The establishment of CORU Medical Scientist Registration Board will require all Medical Scientists to meet the requirements for registration.

11. The Reputation of the School in the Delivery of this Programme

11.1. School of Biological Sciences – Background

The School of Biological Sciences was originally the School of Chemistry and Biology and was one of the original Schools in the City of Dublin Vocational Education Committee, College of Technology, Kevin Street. The School of Biological Sciences as it is today was built from humble beginnings and in the early 1970s (1971-1972), the School of Chemistry and Biology had 15 full-time academic staff, only 5 of which were delivering ‘biology’ Programmes. The School of Biological Sciences was established in 1982. The School has always had a strong base in health sciences, offering courses leading to the award of a Diploma in Dietetics and Nutrition since 1948. The School also offered the first courses in Medical Laboratory Technology in 1966. Over the past 70 years, the School has developed a very strong national reputation in the education of medical scientists, dietitians, technicians and graduates for Hospital, Industry and other sectors.

Over the last number of years staff within the School have developed a national and international reputation as educators of Medical Scientists and the feedback from employers on our graduates support this. In addition, the School has recently developed a CPD certificate Programme in Histopathological Dissection (level 9), in collaboration with the Faculty of Pathology, Royal College of Physicians, and in association with the ACSLM to advance the scope of practice of Medical Scientists. The School is therefore uniquely and strategically positioned to build on these recognised areas of strength.

In addition to the aforementioned Programmes the School offers undergraduate Programmes in Biomedical and Molecular Diagnostics, Biosciences, Biomolecular Science, Public Health Nutrition, and Human Nutrition and Dietetics (joint with TCD). The School has also introduced a CPD Certificate in Medical Device Decontamination in 2016. In addition the School continues to partner with the ACSLM in the delivery of short courses to meet the continuing professional development needs of the profession.

The School has almost 500 students registered on undergraduate Programmes (level 7 and level 8) and on taught MSc and MPhil and PhD Programmes (level 9 and level 10). These Programmes are delivered by a highly committed and skilled staff base, including 31 academic staff (including 3 Management staff), 7 technical officers, 2.3 laboratory assistants and one School Administrator.
12. Organisation of the DIT, College of Sciences and Health and School of Biological Sciences

12.1. Organisation of DIT

The DIT can trace its origins to the Kevin Street site where the first College was founded in 1887. Under the Dublin Institute of Technology Act, 1992, six colleges formerly under the direction of the CDVEC became a single autonomous educational Institute in 1993. Today the DIT has a student and staff community of some 22,000 people spread across six campuses within a 3km radius. The DIT currently offers Programmes from NFQ Levels 6 to 10 across four Colleges: Arts and Tourism, Engineering, Business, and Sciences and Health. Following the restructuring of DIT in 2009, the School of Biological Sciences is now one of the six Schools which constitute the College of Sciences and Health. The College of Sciences and Health comprises six Schools: Biological Sciences, Chemical and Pharmaceutical Sciences, Mathematics, Physics, Computing and Food Science and Environmental Health. Five Schools are located on the Kevin street campus, with the School of Food Science and Environmental Health located on the DIT Cathal Brugha Street campus.

The DIT is currently engaged in the development and construction of a new integrated campus at Grangegorman, ‘DIT Grangegorman’ near Smithfield in Dublin, (http://www.dit.ie/about/grangegorman/). Currently, approximately 10% of the student body is based in the new site and other constituent colleges of DIT will move to the site on a phased basis as new facilities are completed. The College of Sciences and Health (and hence the School of Biological Sciences) is expected to be operational in the new campus in September 2018/19.

Advanced planning is underway such that the Kevin Street campus, including the School of Biological Sciences, will move to this campus with an anticipated opening date in 2019, providing state-of-the-art teaching and research facilities. In 2010, DIT received over €12m in PRTLI5 funding to build a new research centre on the new Grangegorman Campus, the Environmental Health and Sustainability Institute (www.dit.ie/eshi), to which the School of Biological Sciences was a contributor. The ESHI building (Greenway Hub) has now been completed and the first staff and researchers including DIT Hothouse (DIT Technology Transfer Office) have moved to the facility in April 2016, with the formal opening scheduled for 1st March 2017.

Together with its partners in Blanchardstown (Institute of Technology, Blanchardstown) and Tallaght (Institute of Technology, Tallaght), DIT is engaged in a process towards the establishment of Ireland’s first Technological University, TU4Dublin (www.tu4d.ie). This process will lead to the merger of the three institutes and the development of a new unitary university, providing educational opportunities that are practice-based and research-informed. Detailed discussion, organisational development and strategic planning for an application for a Technological University is underway which is overseen by a Steering Group across the three institutions. It is anticipated that an application for Technological University status will be submitted in 2017, which is dependent on the Technological Universities Bill 2015 legislation which was recently before Government but is yet to be approved.
12.2. Provision of Education in Biomedical Science in the School of Biological Sciences

The School of Biological Sciences is the only accredited centre in the Republic of Ireland delivering a postgraduate qualification for Medical Scientists, the Masters of Science (MSc) Clinical Laboratory Science and is one of only three accredited centres for the education of undergraduate Medical Scientists delivering a BSc (Hons) Biomedical Science. The BSc programme has an intake of 40 students annually and both the MSc and BSc programmes are accredited by the Academy of Clinical Science and Laboratory Medicine (ACSLM) and the Institute of Biomedical Science (IBMS) in the United Kingdom. On successful completion of the BSc academic programme and attainment of the IBMS ‘Certificate of Competence’ through completion of the IBMS registration training portfolio in an approved laboratory enables graduates to apply for registration as a Biomedical Scientist by the Health and Care Professions Council (HCPC) and to then work as a Biomedical Scientist in the United Kingdom. The School has recently developed a CPD Certificate programme in Histopathological Dissection (level 9) in collaboration with the Royal College of Physicians, Faculty of Pathology and in association with the ACSLM. The programme is currently offered with modules in skin and breast, however, the modules will be expanded to include other relevant organs.

12.3. Programmes offered by the School

Currently the School of Biological Sciences offers and administers a suite of major Programmes with a total enrolment of over 500 full-time students in the 2016-2017 academic session:

- BSc (Ord) Biosciences
- BSc (Hons) Human Nutrition and Dietetics*
- BSc (Hons) Public Health Nutrition
- BSc (Hons) Biomedical Science
- BSc(Hons) Biomedical and Molecular Diagnostics
- BSc (Hons) Biomolecular Science
- MSc Clinical Laboratory Science
* Joint Programme with TCD

The school also provides service teaching in fundamental biology, cell biology, biochemistry, physiology and microbiology to Honours Degree Programmes offered by other Schools in the College of Sciences; Optometry, Clinical Measurement Science, Forensic and Environmental Analysis and Physics with Medical Physics and Bioengineering.

13. Programme Management

The management structure for this MSc Programme consists of a Programme Chair, a year 1 Tutor, a year 2 tutor and a Programme Committee. The Programme director will act as the chairperson of the Programme Committee. This position is rotational and is appointed by the Head of School. As this is a professional course, the Programme Director will be a Medical Scientist. An Professional Liaison Committee will act in an advisory capacity to the Programme Committee on specialist sectoral issues.
13.1. Programme Committee

The Programme Committee will form an integral part of the overall governance structure. The Programme Committee will have the core responsibility for the overall running of the Programme. The committee is a forum at which all questions of Programme-specific policy, academic integrity, general programme administration, admission regulations, and future curriculum development will be discussed and recommendations will be formulated. The Programme Committee will report to the appropriate authorities in the DIT and will function as an integral part of the School management structures. The Programme Chair will act as the chairperson of the Programme Committee. The membership is listed in Table 9.

Table 9 Details of the MSc in Clinical Laboratory Science Programme Committee

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme Chair</td>
<td>Mr. Fabian McGrath</td>
<td><a href="mailto:Fabian.mcgrath@dit.ie">Fabian.mcgrath@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Transfusion Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1 tutor</td>
<td>Dr. Helen Lambkin</td>
<td><a href="mailto:helen.lambkin@dit.ie">helen.lambkin@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Cellular Pathology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2 Tutor</td>
<td>Dr. Fergus Ryan</td>
<td><a href="mailto:Fergus.x.ryan@dit.ie">Fergus.x.ryan@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Molecular Biology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of School</td>
<td>Associate Professor Mary Hunt</td>
<td><a href="mailto:Mary.hunt@dit.ie">Mary.hunt@dit.ie</a></td>
</tr>
<tr>
<td>Assistant Heads Of School</td>
<td>Dr. Jan Guerin</td>
<td><a href="mailto:Jan.guerin@dit.ie">Jan.guerin@dit.ie</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Steve Meaney</td>
<td><a href="mailto:Steve.meaney@dit.ie">Steve.meaney@dit.ie</a></td>
</tr>
<tr>
<td>Lecturers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer - Immunology</td>
<td>Dr. Sara Lynch</td>
<td><a href="mailto:sara.lynch@dit.ie">sara.lynch@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Haematology</td>
<td>Dr. Greg Byrne</td>
<td><a href="mailto:greg.byrne@dit.ie">greg.byrne@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Molecular Clinical Chemistry</td>
<td>Mr. Frank Clarke</td>
<td><a href="mailto:frank.clarke@dit.ie">frank.clarke@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Molecular Diagnostics</td>
<td>Dr. Fergus Ryan</td>
<td><a href="mailto:Fergus.x.ryan@dit.ie">Fergus.x.ryan@dit.ie</a></td>
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<tr>
<td>Lecturer - Cellular Pathology</td>
<td>Dr. Helen Lambkin</td>
<td><a href="mailto:helen.lambkin@dit.ie">helen.lambkin@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Cellular Pathology and Clinical Cytology</td>
<td>Ms. Alison Malkin</td>
<td><a href="mailto:alison.malkin@dit.ie">alison.malkin@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Transfusion Science</td>
<td>Mr. Fabian McGrath</td>
<td><a href="mailto:fabian.mcgrath@dit.ie">fabian.mcgrath@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Biostatistics</td>
<td>Dr. John Kearney</td>
<td><a href="mailto:John.Kearney@dit.ie">John.Kearney@dit.ie</a></td>
</tr>
<tr>
<td>Senior Lecturer I - Medical Microbiology</td>
<td>Dr. Celine Herra</td>
<td><a href="mailto:celine.herra@dit.ie">celine.herra@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Medical Microbiology</td>
<td>Dr. Denise Drudy</td>
<td><a href="mailto:denise.drudy@dit.ie">denise.drudy@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Microbiology</td>
<td>Dr. Julie Naughton</td>
<td><a href="mailto:julieann.naughton@dit.ie">julieann.naughton@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Microbiology</td>
<td>Dr. Shane Dillon</td>
<td><a href="mailto:shane.dillon@dit.ie">shane.dillon@dit.ie</a></td>
</tr>
<tr>
<td>Lecturer - Biochemistry</td>
<td>Dr. Andrew Know</td>
<td><a href="mailto:andrew.knox@dit.ie">andrew.knox@dit.ie</a></td>
</tr>
<tr>
<td>Student Representatives, year 1 and year 2</td>
<td>Dr. Niamh Gilmartin</td>
<td><a href="mailto:Niamh.gilmartin@dit.ie">Niamh.gilmartin@dit.ie</a></td>
</tr>
</tbody>
</table>

13.2. Membership of the Professional Liaison Committee

This committee will act in an advisory role and bring the viewpoint of the medical scientist profession to the Programme. Normal membership will be four to eight members. This subcommittee will normally meet annually and will be chaired by its representative on the Programme Committee. Members of the profession representing basic grade scientists, laboratory managers and chief medical scientists, will be invited to join the committee.

13.3. External Examiners

External examiners will play a key role in the quality assurance of the revised Programme. The detailed functions and responsibilities of the external examiner are as set out in the sections on External Examiners on the DIT website (available at [http://dit.ie/qualityassuranceandacademicProgrammeregards/external%20examiners_assessors/](http://dit.ie/qualityassuranceandacademicProgrammeregards/external%20examiners_assessors/))

All examiners will be required to attend the Award board at the end of Year Two.

External examiners will be nominated according to the established DIT procedures and will in the future include representation from HUCBMS members. Nominations of the external examiners will be considered by the Programme Committee and by the Head of the School of Biological Sciences. Nominations will be submitted to the College of Sciences and Health Board and subsequently to the DIT Academic Council for approval.

14. Resources available to run the MSc Programme

14.1. School Facilities

The School was the recipient of the Irish Laboratory Awards ‘Education and Research Laboratories of the Year’ 2016. by the Irish Laboratory Awards in 2016. The application for Education Laboratory of the Year was awarded for the state-of-the-art Cellular Pathology and Microscopy Suite that is a facility unique to the DIT. The School has significantly invested in the provision of additional educational resources for staff teaching on this Programme, including the provision of licenses for various e-learning development platforms and for purchase of an audience response system (such as Clickers). In addition to this investment, the College of Sciences and Health (DIT) has invested in a dedicated recording space for the production of online and technology- enhanced learning materials.
In the revised DIT MSc Programme, all teaching will be carried out in the School of Biological Sciences, Kevin St. A dedicated room (KE1-014) that allows block booking for tuition modules will be made available for the Programme. Additional rooms will also be made available, to accommodate specialist tuition and student presentations when required. Computer laboratories in the College of Sciences and Health will also be made available to facilitate tuition in Professional Communications, Medical Biostatistics, Bioinformatics and the use of online learning resources at the DIT. Several large areas have also been converted into common student areas and WiFi is available throughout the campus.

Typically students will conduct the project component of the MSc Programme in their workplace or in an appropriate research centre, e.g. the allied research laboratories described above. As the students may be drawn from a wide variety of hospitals and non-hospital laboratories, the facilities and expertise available are variable. Some students come from large teaching hospitals and work in single speciality laboratories with on-site expertise in conducting research and access to advanced technologies. Other students may come from small hospital or industrial laboratory sites, with a multi-disciplinary laboratory with limited access to a full range of up-to-date equipment. The assessment strategy has been designed to accommodate this range.

### 14.2. Staff

All academic staff in the School of Biological Sciences are educated to MSc (or equivalent) or PhD level. The School has staff in all of the biomedical science disciplines and a list of the staff teaching on the programme is provided in Table 4. The following biomedical science discipline-specific staff are employed on permanent contracts with the DIT as follows:

- 2 Medical Microbiologists
- 2 Immunologists (plus one Assistant Head of School an Immunologist)
- 2 Cellular Pathologists/Clinical Cytologists
- 1 Clinical Chemist (plus one Assistant Head of School a Clinical Chemist)
- 1 Haematologist
- 1 Transfusion Scientist

A number of other staff in the School contribute to the MSc programme and have qualifications in Genetics, Molecular Biology and Microbiology. In addition, the School currently has two Adjunct Senior Lecturers one of whom is a Specialist Scientist heading up the Molecular Pathology Laboratory in Beaumont Hospital and the other is a Lecturer/Researcher in Cancer Biology Linkoping University/Karolinska Institute. The School is seeking Expressions of Interest from Medical Scientists for appointment in an Adjunct status as Lecturer/Senior Lecturer to the School. To ensure the continued quality of teaching and learning on the Programme, all staff undertake continuous professional development (CPD). All new Assistant Lecturers and Lecturers in DIT are required to undertake a minimum of the Postgraduate Diploma in Third Level Learning and Teaching offered by the DIT Learning,Teaching and Technology Centre (LTTC) within the first 2 years of their appointment. Several staff members have already been awarded this diploma and a number have Postgraduate diploma or Masters’ degrees in education (e.g. Applied E-learning). The LTTC of the DIT and the College of Sciences and Health host regular sessions in teaching, learning and best practice in higher education and staff attend such sessions.
The Performance Management Development System (PMDS) process applies to all DIT staff. This process is carried out on a biennial basis with individual staff and the Head of School or Assistant Heads of School and identifies training requirements for staff. These can be met either internally by the Staff Training and Development office of the DIT or else externally if required. The most recent PMDS process was carried out in May/June 2016. Individual training needs are identified and are resourced either through the LTTC, Staff Training and Development Department or the School.

There are a significant number of external discipline experts in biomedical science invited as Guest Lecturers annually, who are reimbursed by the School. This ensures that there is a contribution from the profession in cutting edge knowledge and practice in the clinical setting. In addition, the School has appointed a number of adjunct Lecturer and Senior Lecturers that contribute their expertise to the programme.

14.3. Research and Scholarship in the School of Biological Sciences

Research at the School is broadly aligned to the College, Institute and national priorities and aims to positively impact on society, health and societal needs. The integration of research into undergraduate programmes (in particular in final year projects) and postgraduate taught programmes has provided the School with opportunities to expand its research profile and to enhance and build National and International collaborations. Key current areas of research strength within the School can be broadly categorised under the following themes and the School was recently successful in obtaining competitive internal DIT funding to 'Empower the School' in bringing its various research themes together:

- Biomedical Science
- Therapeutics
- Applied Biotechnology Research
- Nutritional Science, Dietetics and Public Health Nutrition

The key research themes in the School of Biological Sciences underpinning Biomedical Science are:

- Immunology and Celiac Disease: This work focuses on the inflammatory mechanisms in Coeliac disease;
- Cervical Cancer and Human Papilloma Virus
- Diet and cancer;
- Nutritional status of patients with *Clostridium difficile* infection;
- Microbial Diagnostics
- Retinitis Pigmentosa, and neovascular Age Related Macular Degeneration
- Epigenetic regulation of gene expression,
- Lipid metabolism
- Bioinformatics
- Radiation therapy research,
- Metal-based drug therapies,
- Computational Biology and novel Therapeutics
- Point of Care Diagnostics
- Ocular diseases,
- Raman spectroscopy and cancer diagnostics
- Applied biotechnology research

The research active environment at the School is characterised by staff within the School securing funding for twenty post graduate students (two part-time) many of which have been recruited in the past two years. This research will transition to the new research institute, the Environmental Sustainability and Health Institute (ESHI) which is nearing completion on the Grangegorman campus of the DIT. Postgraduate students supervised by staff members associated with this programme will take up occupancy in the ESHI building in 2017. This new research institute includes facilities for various types of research activities, from laboratory-based to desk-based and policy work. The DIT Hothouse (Technology Transfer Office) will be sited in EHSI and will create a rich environment supporting research, innovation and commercialisation.

Funding for research is based on competitive grants from national and commercial sources such as DIT Research Awards, the Irish Research Council, the Health Research Board, Safefood, Enterprise Ireland, FIRM and Danone Baby Nutrition. Staff in the School have built up sustainable collaborations nationally with clinical sites, industry and research centres, together with collaborations internationally, which are reflected in the project placement opportunities for students in the USA and Europe.

14.4. Library Facilities

MSc students have full access to library and lending facilities in DIT. DIT Library currently stocks more than 350,000 books and other items and subscribes to nearly 35,000 journal titles. The entire holdings of the DIT libraries, their locations and current status are displayed on the Library WebOPAC. This can be accessed in each library and via the Internet at http://www.dit.ie/library/. Registered users may borrow from any of the libraries. If DIT journal subscriptions do not cover the required articles students may apply for an Inter Library Loan. Alternatively they may apply for an ALCID (Academic Libraries Co-operating in Ireland) and/or a SCONUL (Society of College, National and University Libraries) card. These enable the student to visit another academic library over an academic year. The Library facilities for the School of Biological Sciences are located in The College of Sciences and Health Library on the second floor of the DIT Kevin St. Annexe building (http://www.dit.ie/library/) The DIT library also maintains ARROW (http://arrow.dit.ie/), an open-access research repository which contains a wide range of research material, from conference papers to book chapters. ARROW feeds into RIAN (http://www.rian.ie) a national platform for the dissemination of open access research.

Dedicated DIT library orientation sessions are provided at the start of the MSc Programme which will enable students at different levels to find and use both hardcopy and web resources.
15. Student Support

15.1. Overview

Students can avail of student support services from DIT and are encouraged to do so by the Programme Director, year tutors and the various support services. These include services related to Counselling, Disability, Chaplaincy, Financial Aid, Mature Student support etc. A year tutor is appointed to each year (stage) of the Programme who provides students with their student handbooks and students are orientated with respect to the year 1 Programme curriculum.

Further details of student services is available on the DIT Student Services website: http://www.dit.ie/studentservices/

15.2. Student welfare

All students enrolled on the M.Sc. Programme will have access to student welfare facilities in the DIT. These facilities offer support in areas encompassing counseling and disability services. Guidance on learning, teaching and technology is also available.

15.3. Student counselling services

The student counselling services provide students with a safe space to talk about personal concerns and academic difficulties. Student counsellors provide confidential advice on personal, psychological and academic problems and study skills. Further information is available at http://www.dit.ie/campuslife/counselling/

15.4. Disability support services

The DIT will make every effort, to facilitate access and participation of students with disabilities. The Disability Services Office in the DIT offers a wide range of services to students including the provision of Assistive Technology Services, assessment of specific learning disabilities and a Learning Skills Service particularly for students with dyslexia.

Should a student experience a learning difficulty, they may avail of the dyslexia screenings Programmes available in DIT. If they have been previously diagnosed as dyslexic they are required to meet with a learning support officer as soon as possible after starting their course to organize any special assessment or exam arrangements. If they wish to avail of specialized supports and exam accommodations from the Disability Service, then the student must have a full psycho-educational report, which has been completed by a registered (PSI) Educational/Clinical Psychologist. See http://www.dit.ie/campuslife/disability/dyslexiascreening/ for further information.
15.5. Learning, Teaching and Technology support

To improve the learning experience, DIT offers Learning, Teaching and Technology support and has established a strong e-learning infrastructure and IT Support and advice services are available to all students through the IT Service Desk or from local IT Support staff. See http://dit.ie/ls/ and http://lttc.dit.ie/