Programme of study for the integrated degree of PhD and MSc (Tissue Engineering and Regenerative Medicine – Innovation in Medical & Biological Engineering)

Year One (a total of 120 credits in taught modular courses will be taken as well as the research project)

- The candidate will commence research under the direction of their supervisor(s) from term 3.

- Compulsory training and skills module:
  MECH5005 Training and professional development activities (15 credits)

- Compulsory specialised subject modules:
  LUBS5247 Managing for innovation (15 credits)
  MECH5002 Cross disciplinary laboratory placement (15 credits)
  MECH5007 Systematic review (15 credits)
  MECH5009 Research project proposal (5 credits)
  MECH5565 Medical engineering experimental design and analysis (15 credits)

- Candidates are required to select two (30 credits) from the following optional modules with a maximum of 40 credits below level M in Year 1:

  - CMNS5110 Generic Methodologies for Bionanotechnology (15 credits)
  - CMNS5500 Self-Assembling Nanostructured Molecular Material & Devices (15 credits)
  - CMNS5800 Bionanotechnology (15 credits)
  - CMNS5850M Nanotoxicology (15 credits)
  - DSUR5072 Stem Cell Therapy and Tissue Engineering (10 credits)
  - MECH3225 Biomedical Engineering Design (20 credits)
  - MECH5221 Spinal Biomechanics and Instrumentation (distance learning) (15 credits)
  - MECH5270 Basic Orthopaedic Engineering (15 credits)\(^1\)
  - MECH5410 Surface Engineering (15 credits)
  - MECH5490 Biomaterials (short course) (15 credits)
  - MECH5500 Functional Joint Replacement Technology (short course) (15 credits)
  - MECH5510 Computational; and Experimental Methods (15 credits)
  - MECH5570 Introduction to Tribology (15 credits)
  - MICR1201 Introduction to Microbiology (10 credits)
  - MICR1220 Introduction to Immunology (10 credits)
  - MICR5100 Tissue Engineering (15 credits)
  - PHYS5320 Thin Films and Surfaces (15 credits)

Students will be required to pass at least 90 taught credits in order to progress on the programme.

Year Two (a total of 60 credits in taught modular courses will be taken as well as the research project)

- The candidate will continue research under the direction of their supervisor(s)

- Compulsory training and skills module:
  MECH5006 Training and professional development activities 2 (15 credits)

- Compulsory specialised subject modules:
  MECH5003 Industrial Research Project (15 credits)
  LUBS5980M Innovation Management in Practice (15 credits)

- Candidates are required to study 15 credits from the following optional modules with a maximum of 30 credits below level M across the two years of study:

  - CMNS5110 Generic Methodologies for Bionanotechnology (15 credits)
  - CMNS5500 Self-Assembling Nanostructured Molecular Material & Devices (15 credits)

\(^1\) Is only for students from a non-engineering / physical sciences background.
INTEGRATED DEGREE OF PHD AND MSC (TISSUE ENGINEERING AND REGENERATIVE MEDICINE – INNOVATION IN MEDICAL AND BIOLOGICAL ENGINEERING)

- CMNS5800 Bionanotechnology (15 credits)
- CMNS5850M Nanotoxicology (15 credits)
- DSUR5072 Stem Cell Therapy and Tissue Engineering (10 credits)
- MECH3225 Biomedical Engineering Design (20 credits)
- MECH5221 Spinal Biomechanics and Instrumentation (distance learning) (15 credits)
- MECH5270 Basic Orthopaedic Engineering (15 credits)
- MECH5410 Surface Engineering (15 credits)
- MECH5490 Biomaterials (short course) (15 credits)
- MECH5500 Functional Joint Replacement Technology (short course) (15 credits)
- MECH5510 Computational; and Experimental Methods (15 credits)
- MECH5570 Introduction to Tribology (15 credits)
- MICR1201 Introduction to Microbiology (10 credits)
- MICR1220 Introduction to Immunology (10 credits)
- MICR5100 Tissue Engineering (15 credits)
- PHYS5320 Thin Films and Surfaces (15 credits)

Students will be required to pass at least 150 taught credits and successfully transfer to full PhD status in order to progress on the programme.

Years Three and Four

- The candidate will continue research under the direction of their supervisor(s)

Learning Outcomes / Transferable Key Skills / Learning Context / Assessment – overall programme integrated degree of PhD and MSc (Tissue Engineering and Regenerative Medicine – Innovation in Medical & Biological Engineering)

1. Learning Outcomes

On completion of the programme students should have shown evidence of being able:

- to demonstrate in-depth, specialist knowledge and mastery of techniques relevant to medical technologies in the interdisciplinary theme of Tissue Engineering and Regenerative Medicine and/or to demonstrate a sophisticated understanding of concepts, information and techniques at the forefront of the discipline;

- to exhibit a wide breadth of knowledge and mastery of generic and subject-specific intellectual abilities and specific industry/clinical related skills such as the use of modelling software, data collection, aspects of legislation, innovation and ethics;

- to demonstrate a comprehensive understanding of techniques applicable to their own research or advanced scholarship in the field of Tissue Engineering and Regenerative Medicine;

- to take a proactive and self-reflective role in working and to develop professional relationships with others;

- proactively to formulate ideas and hypotheses and to develop, implement and execute plans by which to evaluate these;

- critically and creatively to evaluate current issues, research and advanced scholarship in the discipline.

- undertake a research project and be able to plan, research, execute and analyse the results from an appropriate programme of work.

2 Only one Training and Development Activity module can be counted towards the qualification if exiting the degree scheme early.

3 Is only for students from a non-engineering / physical sciences background.
2. Transferable (Key) Skills

Masters (Taught), Postgraduate Diploma & Postgraduate Certificate students will have had the opportunity to acquire the following abilities as defined in the modules specified for the programme:

- the skills necessary to undertake a higher research degree and/or for employment in a higher capacity in industry or area of professional practice;
- evaluating their own achievement and that of others;
- self direction and effective decision making in complex and unpredictable situations;
- independent learning and the ability to work in a way which ensures continuing professional development;

3. Learning Context

For Masters (Taught) students the learning context will include the analysis of, and decision making in, complex and unpredictable situations. The structure of the programme will provide breadth and/or depth of study and opportunities for drawing upon appropriate resources and techniques. Opportunities will be provided for students to develop:

- interests and informed opinions;
- their involvement in the design and management of their learning activities;
- their communication of their conclusions;

Students will be expected to progress to fully autonomous study and work.

4. Assessment

Achievement for the degree of Master (taught programme) will be assessed by a variety of methods in accordance with the learning outcomes of the modules specified for the year/programme and will involve the achievement of the students in:

- evidencing an ability to conduct independent in-depth enquiry within the discipline;
- demonstrating the ability to apply breadth and/or depth of knowledge to a complex specialist area;
- drawing on a range of perspectives on an area of study;
- evaluating and criticising received opinion;
- make reasoned judgements whilst understanding the limitations on judgements made in the absence of complete data.