

Masters, Postgraduate Diploma, Postgraduate Certificate in Cell & Tissue Engineering (2019-20 onwards)

Programme Specification Template: Postgraduate

Information for students: the programme specification is the definitive document summarising the structure and content of your degree programme. It is reviewed and updated every year as part of Keele’s Curriculum Annual Review and Development process. The document aims to clarify to potential and current students what you can expect from the study of the subject over the course of your programme.

Names of programme(s) and award title(s)	MSc Cell & Tissue Engineering PGDip Cell & Tissue Engineering PGCert Cell & Tissue Engineering
Mode of study	Full time / part time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 7
Duration:	One year full time / two years part time

Details of professional, statutory and regulatory body (PSRB) (If appropriate):

<http://www.keele.ac.uk/qa/professionalstatutoryregulatorybodies/>

External Examiner(s) names: <http://www.keele.ac.uk/qa/externalexaminers/>

1. What is the philosophy of the Programme?

The aim of the programme is to provide multi-disciplinary Masters level postgraduate training in Cell and Tissue Engineering and improve the students’ career prospects. These involve building on existing undergraduate knowledge in basic sciences and applying them to regenerative medicine and biomedical engineering relevant to the healthcare sector.

The overall objectives are:

- To provide a postgraduate level training leading to professional careers in Cell and Tissue Engineering in a wide range of healthcare establishments such as medical organisations, medical research institutions, NHS Trust hospitals, life science and medical related industry
- To provide an opportunity for in-depth research into specialist and novel areas of regenerative medicine
- To expose students to practical work in a hospital environment with hands-on knowledge of patient care
- To introduce students to exciting new fields such as stem cell therapy, new implants, bioengineering of tissue and organs, biomaterials and novel technologies for physiological monitoring (latter if the elective physiological measurement is selected)

The course runs alongside an MSc course in Biomedical Engineering, giving students unique access to modules in that field, as well as more traditional topics in biomedical engineering such as physiological and functional measurement, medical device design and applications, and medical equipment management.

On successful completion of the programme, students can expect to be able to:

- 1) Demonstrate a comprehensive understanding of the core biology and engineering principles associated with Cell and Tissue Engineering.
- 2) Display a systematic understanding of physiological and/or biomedical measurement and quality control issues
- 3) Acquire solid knowledge of the core generic principles in regenerative medicine including stem cell, cell and gene therapies.
- 4) Demonstrate the critical awareness of advanced technologies in associated cell culture environments, biomimetic materials and new techniques in regenerative medicine.
- 5) Display the independent working and problem-solving capacity in the research projects alongside critical literature review and data interpretation.
- 6) Develop the capacity to transfer scientific knowledge into practical application in current and subsequent career choice.

The goal of the programme is to provide multi-disciplinary Masters level postgraduate training in Cell & Tissue Engineering to prepare students for future employment across a range of technical and healthcare environments including medical organisations, medical research institutions, NHS Trust hospitals, medical related industry (pharmacies, life sciences, medical devices), and other healthcare environments.

Engagement with this programme will enable you to further develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Whilst you will undoubtedly have already developed these skills and abilities to varying degrees, such existing capabilities can always be deepened and enriched. Our educational programme and learning environment is designed to help you to develop further as a well-rounded postgraduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in during and after your studies at Keele.

Please refer to the programme webpages for a statement how to achieve the Keele Graduate Attributes through full engagement in the programme and other educational opportunities at Keele. Further information about the Keele Graduate Attributes can be found here: <http://www.keele.ac.uk/journey/>

2. How is the Programme taught?

Teaching is delivered primarily through lectures, interactive-styled conference and seminars, and associated web-based Virtual Learning Environment materials. These are accompanied by tutorials, laboratory-based practical sessions, and research seminars by internationally and nationally known scientists, engineers and clinicians. In addition, students attend workshops and site visits, participate in problem-solving scenarios, and receive dedicated research project supervision. The programme also integrates development and execution of entrepreneurial skills for the field of Regenerative Medicine. Reflective of postgraduate education, self-directed learning is also a major component during both full-time and part-time studies.

The diversity of learning and teaching methods encountered by students supports development of independent learning skills and critical thinking as well as the acquisition of subject specific knowledge, relevant to the field of Regenerative Medicine. This enables students to meet the range of intended learning outcomes covering specific bioengineering and scientific principles and demonstration of independent research and problem solving.

Teaching for the modules for the programme are undertaken by academics who are research experts in the field, with many key staff being qualified Fellows of the Higher Education Academy (FHEA).

3. What is the Structure of the Programme?

The programme consists of 6 compulsory modules supplemented by a choice of 2 optional modules. All modules bear 15 credits. The student must gain at least 120 credits from these taught modules. The students have to undertake a research project and submit a dissertation. If successfully completed, the project module provides the additional 60 credits. Altogether, 180 credits are required for Master qualification.

For January intake (students starting from Semester 2 in January), students will proceed as per module and assessment schedule in the respective semesters of a standard September start, except that for these students course runs from January to December (exception to MTE-40055 assessment outlined below in section 4).

Module code	Module title	FHEQ Level	Credit value	Compulsory (C) or optional (O)	Prerequisites	Learning outcomes
MTE-30001	Human Physiology and Anatomy	6	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	1
MTE-30003	Engineering for Medical Applications	6	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	1
MTE-40022	Bioreactor & Growth Environment	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 2, 3, 4
MTE-40023	Biomechanics	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline. Basic knowledge of trigonometry and (vector) calculus	2, 4
MTE-40024	Human Physiology and Anatomy	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	1
PHA-40236	Biotechnology and Omics	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	2, 4
MTE-40026	Physiological Measurement	7	15	O	Basic knowledge of physics or electronics. In addition completion of undergraduate module in human physiology and anatomy (Level 6).	2
MTE-40028	Stem Cells: Types, Characteristics and Applications	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 3
MTE-40029	Medical Equipment and Technology Services Management	7	15	O	Bachelor's degree (or equivalent proof of training) in an approved discipline	4, 6
MTE-40030	Nanomagnetics in Nanomedicine	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	4, 6
MTE-	Biomedical Signal	7	15	O	Knowledge of basic mathematics	2

40031	Processing and Modelling				including algebra, trigonometry, differentiation and integration	
MTE-40033	Cell and Tissue Engineering	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1,3
MTE-40034	Cell Biomechanics	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 2
MTE-40036	Biomaterials	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 4
MTE-40038	Medical Device Design Principles	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	
MTE-40039	Experimental Research Methods	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 2, 3, 4, 5, 6
MTE-40015	Project – Medical Technology (dissertation)	7	60	C for Masters	Bachelors degree (or equivalent proof of training) in an approved discipline	1, 2, 3, 4, 5, 6
MTE-40055	Disease Modelling & Therapy for Regenerative Medicine	7	15	C	Bachelors degree (or equivalent proof of training) in an approved discipline	1,3,4,5,6
PHA-40190	Development of Biopharmaceuticals	7	15	O	Bachelors degree (or equivalent proof of training) in an approved discipline	2,4

MSc Cell and Tissue Engineering *180 credits*

PGDip Cell and Tissue Engineering *120 credits*

PGCert Cell and Tissue Engineering *60 credits*

4. How is the Programme assessed?

A variety of assessment methods are used across the programme. These include coursework-based essays, written examinations, reports on laboratory-based practicals, essay-based examination, interactive oral presentations, and a dissertation based on the student research project. Most of the modules include two or three assessment methods, e.g. unseen exam plus practical report or an essay. Clear marking guidelines accompany each mode of assessment where a mark of 50% or above is required to achieve a pass. Through adoption of the above assessment methods students are given an opportunity to display achievements spanning knowledge and problem-solving abilities, communication and research skills, development of practical skills, and critical thinking. The students have an opportunity to take one re-sit when the mark is below 50%.

Formative assessment occurs in a continuous process driven by lecturer-led discussion sessions, one-on-one mentoring, and practice presentations and posters. Elements of peer feedback are also used in a formative way.

For January intake (students starting from Semester 2 in January), students taking MTE-40055 will have their assessments in final semester.

5. What are the typical admission requirements for the programme?

Undergraduates with a first or upper second-class degree (or equivalent) in biology, life sciences, medicine, engineering, physical or professions allied to medicine are eligible to apply. The applicants with other professional qualifications acceptable to the University are eligible to apply. For international applicants, an English language IELTS score of 6.5 or above is required. The admission of 3+1+1 programme students will follow the additional agreement between Keele and the partner university.

6. How are students supported on the programme?

Support is provided throughout the study period with a broad range of student-centred activities. Initial support is provided during the Induction Week where orientation, study skills introductions, and welcoming events are held, led by the course and the university. Accompanying these events the course handbook, which students receive on their first day, details key course information, module structure, module content, assessment formats, and relevant University regulations.

All students are allocated a personal tutor at the beginning of the course. This offers an individual resource for assistance with both academic and personal issues where detrimental impacts on academic outputs can develop. Students are invited to meet with personal tutors twice a semester unless special needs require a greater frequency. More information is available in the University's Personal Tutoring Policy document. Students for whom English is not their first language are offered language classes, facilities and services by the University's Language Centre. In addition to credit-bearing postgraduate modules on English for academic study, students also have access to one-to-one tutorials for individual help and advice, and to a wealth of resources for self-study and practice. Incoming non-native English speaking students take a diagnostic English language assessment during their first week at Keele, after which personalised recommendations for modules or other forms of support are made. Regular mentoring will also be provided as part of the business skill development in the 'Disease Modelling & Therapy for Regenerative Medicine' (MTE-40055) module.

7. Learning Resources

This programme is based within the School of Pharmacy & Bioengineering. The administration team are based on Keele's main campus. Teaching delivery will be predominately held at the Guy Hilton Research Centre (GHRC), Hartshill Campus.

Students have access to all the facilities in main campus and the UHNM Hospital campus. In particular students have access to a Computer Room at the Guy Hilton Research Centre and extensive IT facilities on the main campus; the Health Library on the hospital campus, and the University library located on the main campus. The main library, for example, houses study spaces that can be used for group work. On-line, physical and electronic data sources are available through Keele University Library. GHRC provides photocopy and printing facility to the students.

8. Other learning opportunities

Opportunities exist for research projects to be performed at other institutions either by prior arrangement or through regular offerings at the Robert Jones and Agnes Hunt Hospital, Oswestry and the Royal Stoke University Hospital.

9. Quality management and enhancement

The course director assumes overall management responsibility for the programme and is accountable to the Director of Postgraduate Programmes and the School of Medicine Postgraduate Learning & Teaching Committee, with student representation.

In addition to:

- Student feedback
- Module evaluation questionnaires
- Regular module leaders' meetings
- Meetings between the programme leads of the cognate courses (Cell and Tissue Engineering and Biomedical Engineering).
- Annual Examinations Board
- Annual External Examiner Reports
- Curriculum Annual Report to the University
- School of Medicine staff development programme

Programme leads report bimonthly to the School Education Committee (SEC), and every semester, module leaders' meet and review teaching effectiveness and plan changes. This feeds into the university's Annual Performance Review (APR) process. Further levels of accountability and course development are achieved through regular student feedback, module evaluation questionnaires, Examinations Boards, External Examiners reports, and ongoing staff development programmes.

A student representative attends Student-Staff Liaison Meetings (SSLMs) every semester, comments of which gets addressed at the Module Leaders Meeting (MLM), and coordinates student feedback from his/her peer group. Module evaluation forms are collected at the end of each module and the comments addressed by module leads.

10. The principles of programme design

Programme has been designed according to University's Learning and Teaching Assessment Strategies. These are based on learning outcomes defined by the UK Standard for Professional Engineering Competence.

11. Programme Version History

Version History	Date	CHANGES / NOTES
Date first created	01-02-2012	Date taken from previous document.
Revision history	September 2017	<p>Removal of ipem accreditation reference- only relates to biomedical engineering.</p> <p>Removal of MTE-40032 Biosensor</p> <p>This elective is to be removed as the member of staff with the expertise is leaving (also historically very poor uptake)</p> <p>NB this has only very recently come to light- on advice from QA office I have removed it from the programme specification and will follow up with appropriate programme modification form</p> <p>Minor changes of wording</p>
	October 2018	Update to entry requirements
Date approved	18-10-18	PG LTC
	8/11/18	FLTC
Revision	13-5-22	<ul style="list-style-type: none"> • Updated text in various sections

		<p>to reflect current offering.</p> <ul style="list-style-type: none">• Updated course modules to reflect current offering (MTE-30001,30003 to be included; MTE-40025 replaced with new module PHA-40236; removed MTE-40037 as it is no longer taught; introduced new module MTE-40055; cross-sharing of module PHA-40190 from MSc PDBM in same School)• Included January intake option and arrangements for that
--	--	--