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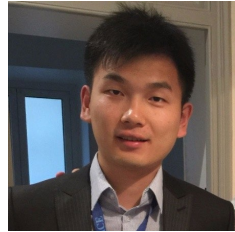
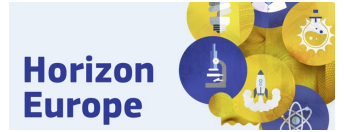
Biomedical Engineering UG/ PGT Programme Development

Programme Director – Dr. Tim C. Pearce (t.c.pearce@le.ac.uk)
Deputy Programme Directory – Dr. Jenny Shepherd (js1005@le.ac.uk)

Biomedical Engineering Research Group (BERG)

EPSRC

Engineering and Physical Sciences
Research Council



Xin Li
Biosignal Processing
Heart Diagnostics



Emine Celiker
Computational
Modelling
Hearing
Research



Himanshu Kaul
Cellular Engineering,
Computational
Biology



**Jenny Shepherd
(Deputy PD)**
Biomaterials
Tissue engineering



Haitao Ye (Deputy HoG)
Antibacterial and
antimicrobial materials



Tim Pearce (HoG/PD)
Sensor processing,
Machine Learning/AI



Avi Bhangaonkar
Research Impact

Some highlights:

- Since 2020 BERG has been successful in attracting research funding totalling over (£2.5 million). BERG contributing to Leicester NIHR Biomedical Research Centre – Cardiovascular Theme (£26 million).
- Launching Bachelor, integrated MEng and MSc in Biomedical Engineering 2025.
- Plans for a cross-college CSE/CLS “Development Centre” in Biomedical Engineering.





Why Leicester?

Strengths

- One of the largest NHS trusts in the country. University Hospitals of Leicester NHS Trust
- Large established medical school with rich history and wide range of clinical expertise. BRC needs more technology know-how
- CSE history on healthcare technology. Specifically, Chemistry, Physics and Engineering
- East Midlands hosts National Rehabilitation Centre (NRC) and Charnwood Life Sciences Campus perfect as a target for new engineering tech
- East Midlands is an innovation hub for MedTech/HealthTech sector
- School has wide set of interdisciplinary life-science related research - potential to cover the breadth of materials and surfaces, control, ML, signal processing, computational modelling, cell engineering
- Our mission statement on inclusion and 'school of choice'



- **Rehabilitation** - Overall the programme has a strong rehabilitation technology focus. We expect students in level 6 to be able to consider a rehabilitation technology (for example an artificial leg prosthetic) from all the required aspects of materials properties, biocompatibility, system modelling/control, embedded computing, ergonomics, sensors/instrumentation, data science and actuators. Students at level 7 should go on to obtain a deeper understanding of biological processes and their relationship to technology, for instance tissue engineering and regenerative medicine.
- **Diagnostics and Medical Devices** – students at levels 6 should be able to design and develop medical devices from concept stage to prototyping and evaluation, e.g. wearable technology. They should be aware of the necessary innovation next steps to market for their, i.e. regulatory frameworks. Level 7 project would consider all the innovation step aspects in detail as part of the MedTech Business Case.
- USP is strong links with our Medical School, School of Healthcare and UHL



- *Do you want to build technology to help people overcome life-changing injuries and health conditions?*
- *Do you want to be part of a rapidly growing field that is at the forefront of innovative healthcare solutions?*

That's **Biomedical Engineering**, transforming healthcare through customised medical devices, prosthetics, and even organs to improve people's lives.

Our degree programme in **Biomedical Engineering** integrates practical skills and expertise in core engineering and the life sciences that takes you to the forefront of some of these latest medical technologies and innovations. Learn how they can be used to diagnose and treat disease. Work directly with researchers to develop new solutions to medical problems. Develop your own technology solutions with expert guidance.

Graduates can pursue careers in fields of medicine and engineering that lie at the frontier of innovative healthcare, **MedTech** and **HealthTech**, such as designing wearable devices to diagnose and treat disease, engineering tissues to repair wounds, developing cutting-edge prosthetics, or develop AI algorithms for medical imaging.

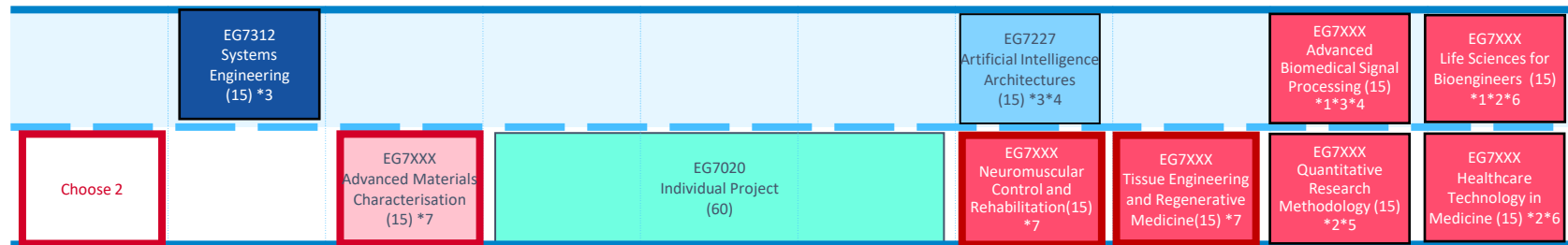
UG Programme Structure Draft

First Year	EG1031 Solid Mechanics (15)	EG1041 Fluid Mechanics (15)		EG1122 Digital Electronics and Communications (15)	EG1203 Principles of Electrical Engineering (15)	EG1016 Engineering Mathematics with programming - I (15)	EG1026 Engineering Mathematics with programming - II (15)	EG1XXX Anatomy and Physiology for Biomechanics (15)
	Common Y1 core modules		EG1102 Thermodynamics and Heat Transfer (15)					
Second Year	Choose 1	EG2111 Materials and Structures (15)		EG2006 Integrated Engineering Design (30)	EG2302 System Dynamics and Control (15)	EG2213 Mechatronics (15)	EG2xxx Embedded systems and IoT (15)	EG2xxx Analogue Electronics and Amplifiers (15)
					EG2321 Computational Engineering Methods (15)		EG2XXX Introduction to Biomaterials (15)	EG2XXX Fundamentals of Biomedical Engineering (15)
Third Year				EG3005 Individual Project (30)			EG3XXX Biological Imaging (15)	EG3XXX Rehabilitation Engineering (15)
	Choose 1					EG3323 Digital Control and Actuators (15)	EG3213 Machine Learning for Engineers (15)	EG3XXX Bio- mechanics(15)
Fourth Year	Choose 1	EG4XXX Systems Engineering (15)	EG4007 Group Project (30)	EG4009 Leadership and Project Management (30)		EG4227 Artificial Intelligence Architectures (15)		EG4XXX Advanced Biomedical Signal Processing (15)
	Choose 2	EG4XXX Advanced Materials Characterisation (15)					EG4XXX Neuromuscular Control and Rehabilitation(15)	EG4XXX Tissue Engineering and Regenerative Medicine(15)

Notes:

The programme draft intends to inherit the school's common First-Year course structure (apart from Anatomy and Physiology). New modules are shown in pink rectangles. Red-bounded rectangles indicate optional modules.

PGT Programme Structure Draft



*1) IPEM: to meet entry requirement – “Life Sciences”. *2) IPEM: compulsory element “Fundamentals in Engineering in Medicine”. *3) IPEM: to meet entry requirement – “Safety and Risk”. *4) IPEM: compulsory element “ICT & Signal processing”. *5) IPEM: compulsory element “Statistics and Research Methods”. *6) IPEM: compulsory element – “Safety and Risk”. *7) IPEM specialist element.

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- History on healthcare technology. Specifically, Chemistry, Physics and Engineering
- East Midlands hosts National Rehabilitation Centre (NRC) and Charnwood Life Sciences Campus perfect as a target for new engineering technologies
- East Midlands is a key innovation hub for MedTech/HealthTech sector

- What training needs in Biomedical Engineering does your company have?
- What key functions do engineers and technologists play in your organisation?
- What domain specific knowledge and skills do you most value in new technology/science related graduates entering your organisation?
- Would you potentially be interested in becoming registered partners for biomedical engineering placement students?

BEng/MEng in Biomedical Engineering MSc in Biomedical Engineering

Here at University of Leicester, School of Engineering, we are developing exciting new IPEM accredited courses in Biomedical Engineering (undergraduate and postgraduate) with modules ranging from biomedical materials through to prostheses, regenerative medicine, biological imaging, digital healthcare, machine learning and AI.

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Double Accreditation and Professional Registration: Professional registration is central to the career development aspirations of this program.

Clinical and Engineering Expertise combined: concurrent delivery life/clinical sciences expertise and core technology is built in from the outset

Leading-edge Technology Focus: Our programme emphasises very latest advances in biomedical engineering technology focus across all key areas: AI, biomaterials, biomechanics, regenerative medicine and tissue engineering.

Research Intensive modules: This biomedical research group led programme means that students are working directly with researchers on real-world healthcare problems and clinical expertise. Some competitors have no obvious direct links to clinical practice.

Projects set by Clinicians and Industry: 2nd year design biomedical engineering project, 3rd individual projects and 4th year group projects will all be defined by UHL/medical school clinical staff or our industrial collaborators. As with our other degrees we expect to employ Visiting Design Professors (VDPs) specialised in biomedical engineering to provide real-world insight into project development.

New student recruitment route from our medical MBChB programme: We are exploring how this programme could be offered as an available alternative to Medicine students who have been rejected for our MBChB Medicine programme.

Integrated Master's option: A 4th year integrated Master's option fully meets the educational requirements to fast-track PEI professional registration so that students are career ready.