

PROGRAMME SPECIFICATION

Higher Diploma in Biomedical Engineering

Awarding institution	Liverpool John Moores University
Teaching institution	ICBT, Colombo ICBT, Kandy ICBT, Southern
JACS Code	
Programme Duration	Full-Time: 18 Months
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Biomedical Sciences (2015) Engineering (2015)
Programme accredited by	
Description of accreditation	
Validated target and alternative exit awards	Higher Diploma in Biomedical Engineering Certificate of Higher Education in Biomedical Engineering
Link Tutor	Karl Jones

Educational aims of the programme

Our unique Biomedical Engineering programme aims to provide the learner with theoretical and practical understanding of Biomedical Engineering up to higher diploma level. Upon successful completion of the programme, the candidate will be able to qualify to enter the final year of the Biomedical Engineering degree of Birmingham City University. The programme will also provide the learner with the skills and expertise needed to work in specialist areas such as assistive technology, rehabilitation, medical imaging and robotics, physiology monitoring, cardiopulmonary engineering, e-health, orthopaedic implants, regenerative medicine and tissue engineering. Biomedical Engineering is a discipline of engineering that interacts with the human body. The learner will be developing and applying innovative skills in the design, manufacturing and maintenance of medical equipment and devices covering all spectrums, from the new born to assistive living for the elderly. Industrial-led practical workshops and labs will help enhance technical skills. This will enable the learner to relate 'real-life' commercial innovations to the underpinning academic theory learnt in the lectures. Along with these technical skills, as an engineer the learner will also gain a diverse range of transferable skills, including effective communication, leadership, the ability to critically assess gaps in target healthcare markets, and the tools required to provide solutions to bridge those gaps.

Alternative Exit/ Interim Award Learning Outcomes - Certificate of Higher Education

A student who is eligible for this award will be able to:

Demonstrate knowledge of the underlying concepts and principles associated with Biomedical Engineering, and an ability to evaluate and interpret these within the context of that area of study. Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts of Biomedical Engineering.

Target award Learning Outcomes - Higher Diploma

A student successfully completing the programme of study will have acquired the following subject knowledge and understanding as well as skills and other attributes.

A student who is eligible for this award will be able to:

1. Understand the scientific principles of biomedical science and engineering which associates with biomedical

engineering.

2. Understand the mathematical models relevant to biology, medicine and related engineering disciplines.
3. Understand and identify problems in the medical field and apply effective solutions to those problems using biomedical engineering applications.
4. Develop an awareness of emerging Information and Communications Technologies (ICT) and apply.
5. Apply a systems approach to biomedical engineering problems.
6. Use essential knowledge to investigate new and emerging health care or medical technologies.
7. Understand the capabilities of computer based models for solving problems in biomedical engineering, and assess the limitations of specific scenarios.
8. Lead and manage the technical design team, the development process and evaluate the essential outcomes.
9. Widen knowledge and comprehensive understanding of health care / medical technology design processes and methodologies and apply and adapt them in unfamiliar situations.
10. Adapt to new technologies and their implementation in the hospital/clinical environment.
11. Be able to conduct experiments using a variety of scientific equipment with minimum guidance.
12. Be able to use software packages to solve biomedical engineering problems (Example – MATLAB, ORCAD, MULTISM etc.).
13. Understand current practice and limitations in the field of biomedical engineering, and appreciate new developments likely to occur.
14. Understand the contexts in which engineering knowledge can be applied (e.g. management, technology, development, etc.).
15. Appreciate, adopt and apply the use of technical literature and other information sources.
16. Gain awareness of the nature of regulatory and contractual issues governing health care / medical technologies.
17. Understand the appropriate codes of practice and medical industry standards.
18. Develop an awareness of quality control issues.
19. Undertake evaluations of risks through some understanding of the basis of such risks pertaining to health care / medical technology.
20. Develop knowledge and understanding of management and business practices, their limitations, and how these may be applied appropriately to strategic and tactical issues.
21. Understand the requirement for relevant engineering activities to promote sustainable technological development in the field of biomedical engineering.
22. Work professionally within the framework of relevant legal requirements governing biomedical engineering activities, including health, safety, and risk (including environmental risk), issues in the clinical context for patient use, and management of medical equipment.
23. Understand the need for professional and ethical conduct in the field of biomedical engineering.

Teaching, Learning and Assessment

The methods used to enable outcomes to be achieved and demonstrated are as follows:

Lectures, tutorials, problem solving sessions, seminars, workshops, computer sessions, participation in projects.

Examinations, assignments, preparation of reports, essays, technological reports, oral presentations, workshops, peer review, computer-based exercises.

Programme structure - programme rules and modules

Level 5	Potential Awards on completion	Higher Diploma
Core	Option	Award Requirements
5500ICBTEG ANALYTICAL MATHEMATICS (15 credits) 5500ICBTEL DESIGN PROJECT		120 core credits at level 5 0 option credits at level 5

(15 credits) 5501ICBTBE MEDICAL INSTRUMENTATION (15 credits) 5502ICBTBE GENERAL AND MEDICAL MICROBIOLOGY (15 credits) 5503ICBTBE BIOMEDICAL SIGNAL PROCESSING (15 credits) 5504ICBTBE CLINICAL IMMUNOLOGY (15 credits) 5505ICBTBE HEALTHCARE INDUSTRY (15 credits) 5505ICBTEL PRINCIPLES AND APPLICATIONS OF MICROCONTROLLERS (15 credits)		
Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4500ICBTBE CELL BIOLOGY AND HUMAN PHYSIOLOGY (15 credits) 4500ICBTEG ENGINEERING MATHEMATICS (15 credits) 4501ICBTBE INTRODUCTION TO BIOMEDICAL ENGINEERING (15 credits) 4502ICBTBE BIOMOLECULAR STRUCTURE AND ANALYSIS (15 credits) 4502ICBTEL DIGITAL ELECTRONICS (15 credits) 4503ICBTBE BIOPHYSICS AND INSTRUMENTATION (15 credits) 4503ICBTEL ANALOGUE ELECTRONICS (15 credits) 4504ICBTEL PROGRAMMING CONCEPTS (15 credits)		120 core credits at level 4 0 option credits at level 4

Information about assessment regulations

All programmes leading to LJMU awards operate within the University's Academic Framework.
<https://www.ljmu.ac.uk/about-us/public-information/academic-quality-and-regulations/academic-framework>

Opportunities for work-related learning (location and nature of activities)

Work-related learning is included within this programme, so students will have the opportunity to engage in real world projects and activities. The programme has active links with industry and involves employers in the industrial projects at each level of the programme. Real world case studies are used wherever possible.

Criteria for admission

Mature entry

In exceptional circumstances, candidates with non-standard qualifications, may qualify for entry to the course on the basis of considerable work experience in the biomedical engineering industry.

Overseas qualifications

Completion of 13 years of formal education in Sri Lanka (or equivalent) and have studied A levels subjects which include maths, science or technology.

Ordinary level qualifications plus the successful completion of a Naric approved Foundation programme in a biomedical or engineering subject

A programme of study that is equivalent to a UK level 3 qualification.

External Quality Benchmarks

All programmes leading to LJMU awards have been designed and approved in accordance with the UK Quality Code for Higher Education, including the Framework for Higher Education Qualifications in the UK (FHEQ) and subject benchmark statements where applicable.

The University is subject to periodic review of its quality and standards by the Quality Assurance Agency (QAA). Published review reports are available on the QAA website at www.qaa.ac.uk

Programmes which are professionally accredited are reviewed by professional, statutory and regulatory bodies (PSRBs) and such programmes must meet the competencies/standards of those PSRBs.

Support for students and their learning

The University aims to provide students with access to appropriate and timely information, support and guidance to ensure that they are able to benefit fully from their time at LJMU. All students are assigned a Personal Tutor to provide academic support and when necessary signpost students to the appropriate University support services.

Students are able to access a range of professional services including:

- Advice on practical aspects of study and how to use these opportunities to support and enhance their personal and academic development. This includes support for placements and careers guidance.
- Student Advice and Wellbeing Services provide students with advice, support and information, particularly in the areas of: student funding and financial matters, disability, advice and support to international students, study support, accommodation, health, wellbeing and counselling.
- Students studying for an LJMU award at a partner organisation will have access to local support services

Methods for evaluating and improving the quality and standards of teaching and learning

Student Feedback and Evaluation

The University uses the results of student feedback from internal and external student surveys (such as module evaluations, the NSS and PTES), module evaluation questionnaires and meetings with student representatives to improve the quality of programmes.

Staff development

The quality of teaching is assured through staff review and staff development in learning, teaching and assessment.

Internal Review

All programmes are reviewed annually and periodically, informed by a range of data and feedback, to ensure quality and standards of programmes and to make improvements to programmes.

External Examining

External examiners are appointed to programmes to assess whether:

- the University is maintaining the threshold academic standards set for awards in accordance with the FHEQ and applicable subject benchmark statements
- the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with University policies and regulations
- the academic standards are comparable with those in other UK higher education institutions of which external examiners have experience
- the achievement of students are comparable with those in other UK higher education institutions of which the external examiners have experience

and to provide informative comment and recommendations on:

- good practice and innovation relating to learning, teaching and assessment observed by external examiners
- opportunities to enhance the quality of the learning opportunities provided to students

Please note:

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full

advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content, teaching, learning and assessment methods of each module can be found in module and programme guides.