Appendix 1

PROGRAMME SPECIFICATION DOCUMENT

1. Qualification: M.Sc degree	2. Programme Title: Medical and Healthcare Devices	3. UCAS Code:	4. Programme Class: Postgraduate Taught FT/PT

5. Main Purposes and Distinctive Features of the Programme

To produce a new generation of technologically-advanced scientists who have the ability to:

1. Lead future developments in the field of medical and healthcare devices
2. Relate the physical and chemical structure of advanced materials to their microscopic and macroscopic properties
3. Provide insight into an advanced material's requirements for current scientific and commercial applications, i.e. those particularly relevant to medicine and healthcare.
4. Use in-depth understanding of a material's properties and behaviour in order to design and develop novel medical devices for 'in-house' or clinical applications
5. Develop novel and diagnostic approaches to technological problems, with a concomitant evaluation of their shortcomings through the interdisciplinary utilisation of smart materials and systems.
6. Have an ability to understand and relate to universal standards, together with ethical and regulatory issues within the healthcare and medical devices' arena
7. Appreciate technological, economical and physiological factors that may influence multifunctional material choice, manufacturing design, processing conditions and modes of application.
8. Design and perform experiments in the medical and healthcare devices area, and to apply appropriate statistical analysis methods in order to interpret the significance of their findings

Special Features:

M.Sc Medical and Healthcare Devices is a programme of study involving a series of short modules linked to extended, Integrated Learning Packages (ILPs) associated with each module. Successful completion of each module, together with its follow-up learning package leads to 15/30 credits towards the final award of an M.Sc degree, i.e. 180 credits in total. An industrially- or University-based project, once completed to the satisfaction of the project supervisors/examiners, will account for 60 credits.

The mean number of staff contact hours is 12.4 per week for full-time and 2.4 per week for part-time students.

6. What a graduate should know and be able to do on completion of the programme

To gain the qualification, the student will have demonstrated:

1) A high level of subject knowledge and understanding
2) Discipline-related practical, cognitive, analytical and professional skills
3) Further general skills and capabilities (e.g., key/transferable skills)
4) Critical awareness of key issues within their subject area
5) A higher level in their ability to critically evaluate current research literature and its employment to solve problems in the Medical and Healthcare Devices field with a high proficiency level

The PG Cert., PG Dip. or M.Sc degree in Medical and Healthcare Devices will be awarded to students who have demonstrated:

!. A systematic understanding of knowledge, together with a critical awareness of current problems and new developments at or communicated by the most active and prominent areas of the Medical and Healthcare Devices field

2. A comprehensive understanding of current 'state-of-the-art' techniques employed in the Medical and Healthcare Devices area

3. A unique application of such knowledge and a practical interpretation of how established and developing research techniques and investigations give rise to the generation and interpretation of data acquired in this field

4. A high level of conceptual understanding which allows (a) the critical assessment of current research and advanced scholarship, and (b) an evaluation of methodologies and their advantages and disadvantages, together with the ability to propose new or alternative hypotheses

In general, holders of the above qualifications will be able to:

1. Systematically and creatively evaluate complex issues in the discipline and hence contribute reliable judgements in the absence of a full set of research data, and also demonstrate the ability to clearly communicate their decisions and ideology to both specialist and non-specialist personnel

2. Demonstrate awareness, self-direction and original thinking in the solving of problems, and act independently in the design, instigation and operation of professional tasks

3. Continue to progress their knowledge and understanding of the Medical and Healthcare Devices field and develop further related skills at the forefront of their discipline

These qualification holders are also expected to possess advantages and transferable skills required for employment in this area, i.e. initiative and personal responsibility, the ability to offer practical solutions to complex and occasionally unpredictable problems, the aptitude to make key research-related decisions and a strong capacity to undertake further professional training.

Knowledge and understanding in the context of the subject(s)

- Relate advanced materials and their properties to required functionality
- Provide insight into advanced and multifunctional materials' requirements for current scientific and commercial applications
- An ability to employ the in-depth understanding of advanced materials' properties and behaviour in order to design and develop novel applications, in particular those for medical and healthcare devices
- Develop diagnostic and novel approaches to technological problems and shortcomings through the interdisciplinary utilisation of advanced materials, microelectronics, mechanical and information technology knowledge.
- Understand and relate to universal standards, ethical and regulatory issues within the healthcare and medical devices' area.

Cognitive skills in the context of the subject(s)

- Application of critical analysis and constructive synthesis.
- Identification of correct design methodologies.
- Ability to synthesise a variety of concepts and solutions.
- Application of creativity and constraint
- Appraisal of technical solutions
- Development of an ability to critically assess the value of published research investigations

Subject-specific practical/professional skills

- Conduct and interpret research and consultancy in the medical services field
- Understand IP development, and ethical and management issues
- Perform cost-benefit analyses on choices of potential raw and manufactured advanced material systems
- Employment of case studies to illustrate understanding at technological and ethical levels

Other skills (e.g. key/transferable) developed in subject or other contexts

- Problem solving
- Presentation methods and techniques.
- Communication and scientific writing skills.
- Use of a range of predictive and analytical techniques.
- Application of technology
- Management and development of self-disciplinary skills
- Intellectual property development
- Advanced statistical analysis of experimental data

7. Qualities, Skills & Capabilities Profile

A Cognitive	B Practical	C Personal & Social	D Other
1. Advanced analytical and statistical methods	1. Report writing (e.g., competent and effective employment of information technology)	1. Self-motivation	1. Environmental awareness (health and safety at work, COSSH, pollution, recycling, etc.)
2. Application of specialised materials/methods	2. Presentation techniques	2. Team-working and an awareness of functions required for organisational success	2. Economic factors (organisation and structure of businesses)
3. Critical analysis of both existing and self-generated concepts in the discipline	3. Practical skills (e.g., characterisation, processing, testing and artefact analysis)	3. Project management (planning and implementation of a research project coupled with the interpretation of experimental investigation data)	3. Awareness of advances/trends in technology
4. Design and assembly	4. Research skills	4. Communication skills	4. Cross-discipline

of novel/specialised products	(including problem-solving)	(in writing, orally and utilising graphics)	cultures: specifically, an adequate accompanying knowledge of associated basic sciences (mathematics, physics, chemistry, engineering and biology, the latter to support aspects of biomaterials)
5. Synthesis and application of design knowledge	5. Application of computer modelling workshop processes	5. Time and resource management	5. Relevant IP issues
6. Creativity, critical analysis and constructive synthesis	6. Application of analytical computer modelling processes & analysis	6. Self-learning/study skills required for continuing professional development	6. Relevant ethical issues

8. Duration and Structure of Programme/Modes of Study/Credit Volume of Study Units
(1 Year full-time; minimum of 2 years part-time).
Masters Degree = 180 credits;
Intermediate Awards of Postgraduate Certificate and Postgraduate Diploma of Higher Education available at 60 and 120 credits respectively.

Module Name	Number	Core/ Option	Pre-Requisite (Recommended)	Credit Value	Level	
Introduction to Medical Devices and Product Regulations	CMD4001	Core		15	M	
Human Physiology and Biotechnology	CMD4002	Core		15	M	
Biomedical Devices and Product Development	CMD4003		CMD4001/2	30	M	
Intelligent Bioengineering systems	CMD4004		CMD4001/2	30	M	
Research Methods (including an Introduction to Medical and Healthcare Devices Ethics, Innovation and IP Management)	CMD4005	Core		30	M	
Research Project	CMD4006		CMD4005	60	M	

9. Learning, Teaching and Assessment Strategy

Learning and Teaching Methods

Practical skills are acquired in the workshop (tutorial) sessions, demonstrations and activity-based assignments. Active learning is promoted via lectures, directed study, laboratory and modelling sessions, together with a strong, original project theme.

Each ILP will be provided to students one week in advance of the module delivery, together with accompanying lecture notes and course materials (including relevant publications from the scientific literature).

Such material is also available as a Web course tool (WebCT) for each module taken.

Assessment Methods

Assessment tasks are linked to the objectives of each module and are normally completed by the end of each of these.
Types of assessment include evaluations of: successful completion of three-part integrated learning packages (ILPs), feedback amendments, assignments, projects, case studies, vivas and oral presentations.

Assessment Classification System

Successful completion of each integrated learning package leads to 15/30 credits (dependent on the module). Subsequent accumulation of credits leads to the following:
60 credits-Postgraduate Certificate
120 credits-Postgraduate Diploma
180 credits- M.Sc Degree

10. Other Information (including compliance with relevant university policies)

Date programme first offered

February 2007

Admissions Criteria

Standard Requirements:

- For the short course element, no formal qualifications are required.
- Admission to the M.Sc course is dependent on successful completion of the integrated learning packages (ILPs) and outcome of one-to-one interviews
- Registration on the full-time course will be subject to the university's normal entry requirement for Masters Programmes (minimum of a class 2(ii) degree in a relevant subject). In addition, overseas students are required to satisfy the University's English language requirements (English language proficiency of at least IELTS 5.0 or its equivalent).

Non-Standard Entry

Experience and Interview (APEL procedure). Such cases are dealt with by the admissions tutor on an individual basis

Indicators of Quality and Standards

- Validation by CMRI's Medical and Healthcare Devices Advisory Board with external subject specialists
- External Examiners moderate ILP assignments (both prior to issue and subsequent to their completion by students) and a range of Research Project Dissertations.
- Prior to sending to external examiners, all ILP coursework and research project dissertations will be examined by internal staff for (1) the inclusion of an appropriate number of references and reference formatting styles and (2) evidence of plagiarism and further abnormalities.

Minimum Period of Registration for the Part-time M.Sc Degree

The minimum period of registration for the part-time M.Sc degree course is 24 months.

Table of Skills Mapping of the Programme's Main Purposes and Distinctive Features

Module	1	2	3	4	5	6	7	8
Introduction to Medical and Healthcare Devices and Product Regulations (CMD4001)			*	*		*	*	
Human Physiology and Biotechnology (CMD4002)		*	*	*		*		
Biomedical Devices Design and Product Development (CMD4003)	*	*	*	*	*		*	
Intelligent Bioengineering systems (CMD4004)	*	*	*	*	*		*	
Research Methods (including an Introduction to Medical and Healthcare Devices Ethics, Innovation and IP Management) (CMD4005)	*	*	*			*	*	*
Research Project (CMD4006)	*		*	*	*		*	*

Skills Mapping of the M.Sc Programme's Main Purposes and Distinctive Features (1-8) to the modules which encompass such skills. For a definition of these, please refer to the first page of the Programme Specification Document.