



## **Module Specification**

### Medical Technology and Enterprise

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## Part 1: Information

**Module title:** Medical Technology and Enterprise

**Module code:** USSJYX-15-3

**Level:** Level 6

**For implementation from:** 2023-24

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Health & Applied Sciences

**Department:** HAS Dept of Applied Sciences

**Partner institutions:** None

**Field:** Applied Sciences

**Module type:** Module

**Pre-requisites:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** This Level 6 optional module is designed as a comprehensive taught coverage of the burgeoning field of medical technology. This includes the biological, materials, and engineering/electronic elements that are combined in innovative ways to form an advanced and continually adapting series of technologies designed to provide solutions for a wide range of medical and healthcare issues and problems in disease diagnosis and prevention, treatment and therapy, including surgical technological developments.

**Features:** Not applicable

**Educational aims:** As well as learning about the science and engineering knowledge that is harnessed and combined to create medical devices and technologies, students will be introduced, through tutorial and case study discussions and exercises, to the innovative and enterprise culture that underpins the ideas and drive that lead to creation and marketing of new technologies. This includes an appreciation of intellectual property and new markets for commercial exploitation of novel technologies, as well as associated ethical issues that may arise when developing and applying novel biomedical-based technologies for diagnosis and treatment of disease, and healthcare quality, to an expanding global and potentially vulnerable population.

**Outline syllabus:**

Definition of medical technology

Medical technology biological principles: nucleic acid, aptamer, peptide, protein (enzyme/antibody), cells tissues, gross anatomy.

Medical technology engineering principles: manufacturing technology including materials (polymers, metals, inks) and fabrication methods (screen-printing, 3D-printing, etc); electronic interfaces, wireless technology.

Diagnosis: Heart monitors, blood pressure monitors, biosensors, MRI scanners, point-of-care.

Treatment: biomedical engineering, surgical implants, medicine/vaccine application devices, hospital and point-of care.

Defence: wearable devices, sensors, airborne threat detection.

Disability and rehabilitation.

Assisting the elderly and infirm.

The medical technology market.

Identifying and protecting intellectual property.

Medical technology and bioethics. Ethical issues associated with medical technology devices, their application and the exploitation of medical technology for commercial gain in a global market.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** Theoretical material within the module will be delivered in the form of weekly lectures throughout one semester in the academic year. The learning of lecture content will be reinforced through time spent in independent learning by the directed reading of recommended texts and through the use of technology enhanced learning resources that will be provided online.

Tutorial sessions will be used principally to engage the students in the development of their research, presentation and data handling skills through the discussion, preparation and delivery of individual case studies covering relevant topics in the field of medical technology. This will constitute Assessment Task 2 of their summative assessment culminating in the students submitting an in depth 1500 word report.

Tutorial sessions will also be used to apply formative assessment in the form of online in class quizzes applied via Blackboard using TEL packages within the faculty and will be used to further engage students in the development of their learning, analytical and revision skills and to provide opportunities for the interactive development of skills required for the work place.

Students undertaking this module can expect to receive 24h of lectures spread appropriately over the 12 weeks of teaching of one semester and would be expected to spend at least another 3h per week in independent learning while undertaking

directed reading in relation to each of the lecture sessions. In addition to the lectures the students will undertake 12h in total of tutorial sessions within the semester.

The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission and undertaking revision for both formative assessment sessions and for the final exam (Assessment Task 1).

**Module Learning outcomes:** On successful completion of this module students will achieve the following learning outcomes.

**MO1** Review the scientific literature relevant to medical technology

**MO2** Gain an understanding of the fundamentals of medical technology, including the interface between medical science and engineering

**MO3** Critically appraise the potential for the applications of medical technology in the bio(medical) science sector in diagnostics, disease prevention, treatment and therapy, including surgical technology

**MO4** Appreciate the importance of enterprise in identifying opportunities to develop new medical technologies and applications

**MO5** Understand the key steps involved in the development of novel medical devices and technologies for the commercial market.

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/index.html) via the following link <https://uwe.rl.talis.com/index.html>

## **Part 4: Assessment**

**Assessment strategy:** Formative tutorial discussions and exercises will prepare for Summative assessment for this module in the form of coursework and an examination. The nature of the programme to which this level 6 module contributes requires both coursework and examination-based assessment of student learning and a measure of their acquisition of written presentation skills of critically discussed and analysed data and information obtained from researching the literature. The tutorials within the module offer the students opportunities to undertake formative assessment in a group environment and further individual formative assessment in the form of online quizzes will also be available. Feedback on formative assessment in tutorials will be given verbally while that for such learning performed online will be part of the design of the quiz.

The ability of the students to write scientifically and analyse data will be assessed under Assessment Task 2 in the form of an extended 1500-word case study report.

Final summative assessment under Assessment Task 1 will take the form of an examination that comprises essay based questions designed to test the ability of the students to critically discuss topics in the subject area and to highlight further independent reading drawing on the literature beyond the content of the lectures that they have undertaken.

**Assessment tasks:**

**Examination** (First Sit)

Description: Written Exam (online - 24 hour window)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

**Case Study** (First Sit)

Description: Case study report (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

### **Examination (Resit)**

Description: Written Exam (online - 24 hour window)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

### **Case Study (Resit)**

Description: Case study report (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

## **Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Biomedical Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Biomedical Science [Sep][FT][Frenchay][4yrs] MSci 2021-22

Applied Biomedical Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Biomedical Science [Sep][SW][Frenchay][5yrs] MSci 2020-21

Biomedical Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Biomedical Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Biomedical Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2020-21

Biomedical Science [Sep][PT][Frenchay][6yrs] BSc (Hons) 2019-20

Biomedical Science [Sep][PT][Frenchay][8yrs] MSci 2019-20

Biomedical Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20

Biomedical Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2019-20