



Module Specification

Applied Clinical Engineering

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Part 1: Information

Module title: Applied Clinical Engineering

Module code: USSKLC-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

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: Pre-requisites: students must have already passed USSKL6-30-1 Scientific Basis of Engineering.

Features: Not applicable

Educational aims: See learning outcomes.

Outline syllabus: Fluid Mechanics:

Basic properties, viscosity, hydrostatics
Piezometer tube, Barometer, use of manometers
Turbulent flow in pipes
Friction loss in pipe systems, pumping power

Gases

Materials:

The basic properties of materials including chemical, electrical, mechanical, physical and durability properties
Introduction to material selection and the concept of choosing an appropriate material for a design application
Biocompatibility of materials

Biomechanical Analysis and Models

Qualitative and Quantitative kinematics

Quality systems

Record keeping - applies to all aspects of the Equipment Life Cycle (Electronic or Paper)

Pre-purchase assessments

Acceptance and Safety Testing

Planned Preventative Maintenance and Repair

Decontamination

Decommissioning and Disposal

Incident investigation/reports through evaluation of factual evidence

Part 3: Teaching and learning methods

Teaching and learning methods: There will be 3 weeks of contact time at UWE in 3 x 1 week blocks. Included in each block week are laboratory workshops, lectures and tutorials. The contact time will equate to approximately 12 hours per block (a total of 36 hours).

In addition to the allocated hours on campus learning, students will engage in synchronous and asynchronous online learning. This will comprise a total of approximately 36 hours of online engagement through a combination of lectures, synchronous online tutorials, synchronous and asynchronous discussions, online quizzes, and collaborative group work.

Theoretical material within the module will be presented to the students in the form of regular lectures throughout each of the semesters in the academic year. During those times of work based learning, these lectures will be delivered online and involve a number of technological enhancements. 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. This online learning and engagement will be delivered through several avenues:

Synchronous online tutorials in protected learning time where the student will contribute/attend an online activity appropriate to the content at the time at which the academic will be present online to facilitate and lead this scheduled/timetabled session. This tutorial will be themed/planned.

Asynchronous discussions in the student's own time (or during protected time where permitted and appropriate) where they will engage/collaborate with other students on the course or in specified groups, and in which the academic is permitted to

moderate where necessary, but is not expected to contribute.

Synchronous surgery sessions timetabled for a specific time in which the academic will be available online to answer live questions via discussion boards/blogs/collaborate or to respond to questions posted/asked prior to the session.

Interactive, online formative quizzes made available either following a particular package of knowledge exchange/learning, or in specified sessions/time periods.

Lectures delivered online through a combination of one or more of the following: visual/audio/interactivity/personal formative assessment

A number of relevant practical sessions will be incorporated during the campus based blocks in addition to the work based learning that must be achieved under supervision by a workplace supervisor. Practical sessions will both drive hands on learning and the acquisition of technical skills at both an individual and group working level.

The remainder of the independent learning time allocated to the module should be spent preparing for the assessments.

Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level. Scheduled sessions may vary slightly depending on the module choices you make.

Generic Graduate Skills

Evidenced:

Communication

Professionalism

Critical Thinking

Digital Fluency

Practiced:

Innovative and Enterprising

Forward Looking

Emotional Intelligence

Globally Engaged

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

MO1 Demonstrate an understanding of the scientific principles that underpin the biomechanics

MO2 Demonstrate an understanding of the scientific principles that underpin biomedical measurement

MO3 Describe each stage of the equipment management life cycle and how this is implemented within healthcare

MO4 Apply engineering principles using systematic and logical methodology, to maintain, calibrate and quality assure a wide range of commonly used equipment within healthcare

MO5 Explain the importance of control of infection and decontamination within the equipment management lifecycle

MO6 Know the processes and regulations relating to the decommissioning and disposal of medical devices

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ussklc-30-2.html) via the following link <https://uwe.rl.talis.com/modules/ussklc-30-2.html>

Part 4: Assessment

Assessment strategy: The Assessment Strategy has been designed to support and enhance the development of both subject-based and more general skills, whilst ensuring that the module's learning outcomes are attained, as described below.

The first assessment is a set exercise which will provide apprentices with an opportunity to demonstrate their knowledge on a broad range of topics through a series of short essay questions and problem-solving questions.

The second assessment is an independent case study of direct relevance to the apprentice's employment, which is to be prepared and presented for assessment as an oral presentation during a block attendance at university.

The third assessment is a contextual review of a recent article related to diagnostic advance(s) in a technique(s) of relevance to the student's employment, the content of which will be negotiated with the appropriate academic tutor.

Assessment tasks:

Set Exercise (First Sit)

Description: Set Exercise

Weighting: 32 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2

Presentation (First Sit)

Description: Case study oral presentation (20 minutes)

Weighting: 48 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO3, MO4, MO5, MO6

Case Study (First Sit)

Description: 1000 word case study

Weighting: 20 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Set Exercise (Resit)

Description: Set Exercise

Weighting: 32 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2

Presentation (Resit)

Description: Case study oral presentation (20 minutes)

Weighting: 48 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO3, MO4, MO5, MO6

Case Study (Resit)

Description: 1000 word case study

Weighting: 20 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Healthcare Science (Radiation Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2022-23

Healthcare Science (Rehabilitation Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2022-23

Healthcare Science (Medical Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2022-23

Healthcare Science (Renal Technology) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2022-23