



Module Specification

Fundamentals of Ultrasound Technology

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Part 1: Information

Module title: Fundamentals of Ultrasound Technology

Module code: UZYY8P-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Health & Applied Sciences

Department: HAS School of Health and Social Wellbeing

Partner institutions: None

Field: Allied Health Professions

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: Not applicable

Features: Not applicable

Educational aims: This module is designed to give a foundation in the science and instrumentation of medical ultrasound, and give you the knowledge and understanding needed to perform examinations safely and competently. It will also address issues relating to new technology and quality assurance.

Outline syllabus: Typically, this module will cover:

Nature of Ultrasound - Continuous-waves: properties, generation, propagation, interactions, processing, acoustic impedance. Pulsed-waves: Piezoelectric effect, beam shapes and transducers, focusing, power, intensity, bandwidth, pulse-repetition frequency, resolution and artefacts.

Instrumentation and System Design - Transducer design and technology ("fitness for role"), pulse-echo principles, A-mode, B-mode, M-mode, real time, measurements. Image storage and recording media, manipulation and display.

Contemporary Advancements – basic overview of tissue harmonic imaging, contrast media, transducer technology, 3D/4D ultrasound.

Doppler Techniques - Doppler Effect continuous and pulsed-wave; analyses and display of Doppler signals (spectral, colour flow imaging, power); clinical applications.

Quality Control and Performance Checks - Quality assurance, acceptance testing and phantoms.

Bio-effects, Dosimetry and Safety - Thermal, cavitation, radiation stress effects ("non-thermal noncavitational"), "in-vivo" "in-vitro", and epidemiological studies, safety indices, methods to minimise risks, current research.

Part 3: Teaching and learning methods

Teaching and learning methods: The module will consist of a mixture of lectures and practical workshops. The student will be expected to contribute to discussions based on your own knowledge and experiences, and recognise gaps in their knowledge and understanding and to investigate these areas by asking questions and reading around the subject.

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

MO1 Explain the systematic application of ultrasound physics, equipment and instrumentation.

MO2 Critically evaluate the equipment and technological processes used to process, display and view images.

MO3 Explain the processes required to produce optimum diagnostic images, and their application.

MO4 Consider and critically evaluate ultrasound technology to enable optimum use of the ultrasound equipment within the current recommendations for safe practice, with particular reference to biohazards.

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/) via the following link <https://uwe.rl.talis.com/>

Part 4: Assessment

Assessment strategy: Summative Assessment: 2 hour examination.

Rationale: The assessment is designed to assess and demonstrate that students can apply an in-depth knowledge of ultrasound physics, equipment and instrumentation to a range of issues, including safety and quality assurance, management of the service and clinical practice. The examination will include a range of question styles to enable assessment of the range of learning outcomes.

Formative Assessment Opportunities: During the module students will have the opportunity to engage in formative exam questions and assessment workshops.

Assessment tasks:

Examination (First Sit)

Description: 2 hour examination.

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Examination (Resit)

Description: 2 hour examination.

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Medical Ultrasound [Glenside] MSc 2023-24