Module Specification

Ultrasound Technology

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Contents

Part 1: Information

Module title: Ultrasound Technology

Module code: UZYSPQ-30-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

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: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: See Learning Outcomes.

Outline syllabus: Nature of Ultrasound:

Continuous-waves: properties, generation, propagation, interactions, processing,

acoustic impedance.
Pulsed-waves: Piezoelectric effect, beam shapes and transducers, focusing, power, intensity (SPTP, SPTA, SATA), 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:

Natural 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 non-cavitational"), "in-vivo" "in-vitro", and epidemiological studies, safety indices, methods to minimise risks (ALARA principle), current research.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning (approximately 80 hours) includes lectures, seminars, demonstration, practical classes, tutorials, project supervision.

Independent learning includes hours engaged with essential reading, assignment preparation and completion. It is anticipated that students will spend approx 160 hours on independent study and 60 hours on preparation and completion of written experimental assignment.

Placement learning: may include a practice placement. Students can negotiate placements and sponsors.

Contact Hours:

A variety of learning approaches will be used, which includes UWE Blackboard in conjunction with key lectures, student-lead seminars and presentations, problem-centred learning, practical workshops and experiments and self-directed study.

Lectures will be provided by the Course Team and external clinical specialists.

Students will require easy access to a computer and the Internet for the duration of the module.

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

MO1 Demonstrate an in-depth knowledge of the physical principles of ultrasound and instrumentation, applied to clinical practice

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

MO3 Identify, assess and resolve potential artefacts on the resultant display

MO4 Undertake quality control tests and critically interpret the resultant measurements

MO5 Consider and critically evaluate the above knowledge to enable optimum use of the ultrasound equipment within the current, internationally recognised recommendations for safe practice, with particular reference to biohazards

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 220 hours

Face-to-face learning = 80 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/uzyspq-30-m.html

Part 4: Assessment

Assessment strategy: A wide range of assessment strategies are employed to ensure that the postgraduate student has acquired the knowledge and understanding, as well as the intellectual, practical and transferable skills for this Programme. The details of the assessments feature in the relevant module handbooks. The assessment strategy of this Programme will thus seek to reflect the learning outcomes of each module.

The assessment for this module consists of a 3000 word written report of a practical assignment (assessment task 1) and a 2 hour written examination (assessment task 2).

Assessment task 1: The practical assignment:

This will involve the student undertaking a form of experimental-type procedure, and writing up a report. This form of assessment will enhance the student's perception of the importance and relevance of the physical principles and instrumentation of diagnostic ultrasound to clinical practice. It will also facilitate the demonstration of

higher order cognitive skills such as synthesis and analysis in their written report.

Assessment task 2: Two hour examination:
The examination consists of two sections, Section A is a compulsory section and consists of multiple choice questions which are worth 40 marks.

Section B:
In this section the student will be given a choice of answering 3 questions from 5. Each question is worth 20 marks The student is encouraged to use evidence to support their answers from clinical practice or current published literature. They are expected to demonstrate background reading and give examples of evidence-based practice to support their learning from lectures and practicals.

Assessment tasks:

Report (First Sit)
Description: 3000 word report of practical assignment
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO3, MO4, MO5

Examination (First Sit)
Description: 2 hour written examination
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO5

Report (Resit)
Description: 3000 word report of practical assignment
Weighting: 50 %
Final assessment: No
Group work: No

Learning outcomes tested: MO1, MO3, MO4, MO5

Examination (Resit)
Description: 2 hour written examination
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study: