



**CORPORATE AND ACADEMIC SERVICES**

**MODULE SPECIFICATION**

Part 1: Basic Data					
Module Title	Ultrasound Technology				
Module Code	UZYSQP-30-M	Level	M	Version	1
Owning Faculty	Health & Life Sciences	Field	Allied Health Professions		
Contributes towards	Post Graduate Certificate in Medical Ultrasound Post Graduate Diploma in Medical Ultrasound MSc In Medical Ultrasound				
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard
Pre-requisites	None		Co- requisites	None	
Excluded Combinations	None		Module Entry requirements		
Valid From	January 2014		Valid to	August 2020	

<b>CAP Approval Date</b>	09/07/2013
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Part 2: Learning and Teaching	
Learning Outcomes	<p>On successful completion of this module students will be able to:</p> <ul style="list-style-type: none"> <li>• Demonstrate an in-depth knowledge of the physical principles of ultrasound and instrumentation, applied to clinical practice (Components A &amp; B)</li> <li>• Critically evaluate the equipment and technological processes used to process, display and view images (Component A)</li> <li>• Identify, assess and resolve potential artefacts on the resultant display (Components A &amp; B)</li> <li>• Undertake quality control tests and critically interpret the resultant measurements (Component B)</li> <li>• 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 (Components A &amp; B)</li> </ul>
Syllabus Outline	<p><b>Nature of Ultrasound</b></p> <p>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.</p> <p><b>Instrumentation and System Design</b></p> <p>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.</p>

	<p><b>Contemporary Advancements</b></p> <p>Natural tissue harmonic imaging, contrast media, transducer technology, 3D/4D ultrasound.</p> <p><b>Doppler Techniques</b></p> <p>Doppler effect, continuous and pulsed-wave; analyses and display of Doppler signals (spectral, colour flow imaging, power); clinical applications.</p> <p><b>Quality Control and Performance Checks</b></p> <p>Quality assurance, acceptance testing and phantoms.</p> <p><b>Bio-effects, Dosimetry and Safety</b></p> <p>Thermal, cavitation, radiation stress effects ("non thermal non-cavitation"), "in-vivo" "in-vitro", and epidemiological studies, safety indices, methods to minimise risks (ALARA principle), current research.</p>
<p>Contact Hours</p>	<p>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.</p> <p>Lectures will be provided by the Course Team and external clinical specialists</p> <p>Students will require easy access to a computer and the Internet for the duration of the module.</p>
<p>Teaching and Learning Methods</p>	<p><b>Scheduled learning</b> (approximately 80 hours) includes lectures, seminars, demonstration, practical classes, tutorials, project supervision</p> <p><b>Independent learning</b> 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..</p> <p><b>Placement learning:</b> may include a practice placement. Students can negotiate placements and sponsors.</p>
<p>Reading Strategy</p>	<p><u>Access and Skills</u></p> <p>All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively. Additional support is available through the <i>iSkillZone</i> available via the Library web pages. This includes interactive tutorials on search skills and on the use of specific electronic library resources. Sign up workshops are also offered by the Library.</p> <p><u>Essential Reading</u></p> <p>Any essential reading will be indicated clearly, along with the method for accessing it, e.g. students may be expected to purchase a set text, be given a print study pack or be referred to texts that are available electronically.</p> <p><u>Further Reading</u></p> <p>Further reading will be required to supplement the set textbook and other printed</p>

	<p>readings. The purpose of this further reading is to ensure students are familiar with current research, classic works and material specific to their interests from the academic literature.</p> <p><u>Blackboard</u> This module is supported by Blackboard where students will be able to find all necessary module information. Direct links to information sources will also be provided from within Blackboard</p> <p>Students are also expected to identify further material for themselves using:-</p> <p>The Library Catalogue via the Library Search - Databases such as</p> <ul style="list-style-type: none"> <li>• Cochrane Library</li> <li>• Cinahl</li> <li>• Medline</li> <li>• Amed</li> <li>• Assia</li> <li>• Embase</li> <li>• PsycInfo</li> </ul> <p>The Library Catalogue - Web sites such as:-  <a href="http://www.bmus.org">www.bmus.org</a>  <a href="http://www.bma.org.uk">www.bma.org.uk</a>  <a href="http://www.legislation.gov.uk/">http://www.legislation.gov.uk/</a>  <a href="http://www.legislation.hmsso.gov.uk">www.legislation.hmsso.gov.uk</a>  <a href="http://www.evidence.nhs.uk/">http://www.evidence.nhs.uk/</a>  <a href="http://www.ob-ultrasound.net/">www.ob-ultrasound.net/</a></p>
Indicative Reading List	<p>Fish, P. (1996) Diagnostic Medical Ultrasound. Chichester: John Wiley and Sons</p> <p>Gent, R. (1997) <i>Applied Physics and Technology of Diagnostic Ultrasound</i> Prospect, South Australia: Milner Publishing Ltd</p> <p>Gibbs, V., Cole, D. and Sassano, A. (2009) <i>Ultrasound Physics and Technology. How, Why and When?</i> Churchill: Livingstone</p> <p>Hedrick, Hykes and Starchman (2005). <i>Ultrasound Physics and Instrumentation.</i> Elsevier</p> <p>Hoskins, P. (1995) <i>Testing of Doppler Ultrasound Equipment</i> London: Institute of Physical Sciences in Medicine</p> <p>Hoskins, PR., Martin, K., Thrush, A. (2010) <i>Diagnostic Ultrasound: Physics and Equipment.</i> 2<sup>nd</sup> edition. Cambridge: University Press</p> <p>Kremkau, F.W. (2006). <i>Diagnostic Ultrasound Principles and Practice. Principles and Instrumentation.</i> 6<sup>th</sup> edition: Saunders</p> <p>Oates, C. (2001). <i>Cardiovascular Haemodynamics and Doppler Waveforms Explained.</i> Greenwich Medical Media</p> <p>Zagzebski, J.A. (1996) <i>Essentials of Ultrasound Physics.</i> St Louis: Mosby</p>

<b>Part 3: Assessment</b>	
Assessment Strategy	<p><i>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.</i></p>

	<p>The assessment for this module consists of a 3000 word written report of a practical assignment (component B) and a 2 hour written examination (component A).</p> <p><b>Component B: The practical assignment</b>  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.</p> <p><b>Component A: Two hour examination</b>  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 five. 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.</p>
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Identify final assessment component and element	<b>A</b>	
% weighting between components A and B (Standard modules only)	<b>A: 50</b>	<b>B: 50</b>
<b>First Sit</b>		
<b>Component A</b> (controlled conditions) <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1. Two hour written examination	100	
<b>Component B</b> <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1. 3000 word report of practical assignment	100	

<b>Resit (further attendance at taught classes is not required)</b>		
<b>Component A</b> (controlled conditions) <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1. Two hour written examination	100	
<b>Component B</b> <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1. 3000 word report of practical assignment	100	
If a student is permitted an <b>EXCEPTIONAL RETAKE</b> of the module the assessment will be that indicated by the Module Description at the time that retake commences.		