Module Specification

KEY FACTS

Module name	Fundamental Principles of Ultrasound Practice
Module code	RDM004
School	School of Health Sciences
Department or equivalent	Division of Applied Biological, Diagnostic and Therapeutic Sciences
UK credits	15
ECTS	7.5
Level	7

MODULE SUMMARY

Module outline and aims

This module will provide you with the underpinning academic knowledge of ultrasound and instrumentation, and the associated artefacts, hazards and safety implications, so that you can apply this material to the clinical situation and operate the equipment in a safe and professional manner, providing the best images possible to allow for accurate diagnosis.

Content outline

The module will cover the production and propagation of ultrasound, the equipment used including probe construction & operation, measurements of size, Doppler principles and application, artefacts, hazards and safety.

Co-requisites:

For the ultrasound programme, this is a core module for any award. It should be studied along with the Developing Advanced Practice module and at least one clinical module to gain credits for a PG Certificate.

WHAT WILL I BE EXPECTED TO ACHIEVE?

On successful completion of this module, you will be expected to be able to:

Knowledge and understanding:

- Demonstrate a thorough knowledge of the physical processes by which ultrasound is produced and propagated through tissues and the equipment and operating modes by which ultrasound information is obtained.
- Identify artefacts and critically evaluate their implications in clinical practice.
- Recognise and critically discuss the limitations and biohazards of the equipment and techniques employed in clinical practice.
- Consider and evaluate the above knowledge to enable optimal use of the ultrasound equipment within the current, internationally recognised

recommendations for safe practice.

Skills:

- Critically evaluate equipment selection and settings and their impact on image quality and biological hazards.
- Evaluate evidence and consider its impact on practice.
- Understand the basic principles of production and propagation of sound and evaluate the equipment needed to produce diagnostic ultrasound.
- Use reflective practice in relation to equipment selection and settings, hazards and safety, artefact production and ways to reduce them.

Values and attitudes:

- Take responsibility for delivering safe, high quality client care

HOW WILL I LEARN?

You will learn through formal lectures, tutorials, seminars, self study, clinical experience in the ultrasound department, e-learning activities. Contact hours include directed learning and on-line lectures.

The module runs across terms 1 and 2.

Teaching pattern:

Teaching component	**Teaching type**	**Contact hours (scheduled)**	**Self-directed study hours (independent)**	**Placement hours**	**Total student learning hours**
Physics of ultrasound	Tutorial	9	20		29
Production, propagation and interactions of ultrasound	Lecture	6	15		21
Ultrasound equipment and scan controls	Lecture	12	25	Ongoing	21
Image quality, resolution and	Lecture	6	15	Ongoing	21

artefacts					
Basic Principles of Doppler Ultrasound	Tutorial	6	15		21
Hazards & safety	Lecture	6	15		21
Totals		45	105	0	150

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessments

You will be assessed during a written examination to examine your comprehension and understanding of the clinical application of ultrasound physics, equipment, image quality, Doppler and safety. A short answer examination and multiple choice questions (MCQ) will be used to examine your understanding of the fundamental principles of ultrasound and underlying physics and the link between theory and clinical practice. Additionally some skills will be developed during clinical practice, in tutorials and in the ultrasound skills suite.

Assessment pattern:

Assessment component	**Assessment type**	**Weighting**	**Minimum qualifying mark**	**Pass/Fail?**
Short Examination and MCQ	Written Exam	30	50%	N/A
Examination	Written exam	70	50%	N/A

Assessment criteria

Assessment Criteria are descriptions of the skills, knowledge or attributes you need to demonstrate in order to complete an assessment successfully and Grade Related Criteria are descriptions of the level of skills, knowledge or attributes you need to demonstrate in order to achieve a certain grade or mark in an assessment.

Assessment criteria and Grade-Related Criteria for module assessments will be made available to you prior to an assessment taking place. More information will be available

in the module guide and on the virtual learning environment.

Feedback on assessment

Following an assessment, you will be given your marks and feedback in line with the Assessment Regulations and Policy. More information on the timing and type of feedback that will be provided for each assessment will be available from the module leader.

If you fail the module you may be offered a resit opportunity. If you successfully complete a resit you shall be awarded the credit for the module. The mark used for the purposes of calculation towards the award shall be the greater of the minimum pass mark for the module or the original mark obtained at the first attempt, as specified in the programme structure.

Assessment Regulations

The Pass mark for the module is 50%. Any minimum qualifying marks for specific assessments are listed in the table above. The weighting of the different components can also be found above. The Programme Specification contains information on what happens if you fail an assessment component or the module.

INDICATIVE READING LIST

Essential:

Gibbs, V. Cole, D. Sassano, A. (2009) *Ultrasound Physics & Technology. How, why & when*. Churchill Livingstone

OR

Hoskins, P. Thrush, A. Martin, K. Whittingham, T. (2010) *Diagnostic Ultrasound; Physics & Equipment.* 2nd edition. Cambridge University Press.

Recommended:

Allan, P. Mc Dicken, W. Pozniak, M. Dubbins, P. (2006) *Clinical Doppler Ultrasound*. 2nd edition, Churchill Livingstone

Hedrick, W. Hykes, D. Starchman, D. (2004) *Ultrasound physics & Instrumentation*. 4th edition. Mosby

Kremkau, F. (2010) *Sonography Principles and Instruments. 8*th edition. W B Saunders & Co

Ter Haar, G. (2012) *The Safe Use of Ultrasound in Medical Diagnosis*. 3rd edition. The British Institute of Radiology. **Free access from**: http://www.birjournals.org/site/books/ultrasound.xhtml

Thrush, A. Hartshorne, T. (2010) *Peripheral Vascular Ultrasound: how, why and when*.

3rd edition. Churchill Livingstone

Zagzebski, J. (1996) *Essentials of Ultrasound Physics* Mosby

Websites, such as:

http://www.aium.org

http://www.bmus.org

http://www.efsumb.org

http://www.e-lfh.org.uk/home/ E-Learning for Healthcare

http://www.gla.ac.uk/Acad/ClinPhys/UEEP/info.htm

and manufacturers websites (see module guide)

Journals, including:

- British Journal of Radiology
- Journal of Clinical Ultrasound
- RAD Magazine
- Radiology
- Ultrasound in Medicine & Biology
- Journal of Ultrasound in Medicine
- Ultrasound

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Appendix: *see http://www.hesa.ac.uk/content/view/1805/296/ for the full list of JACS codes and descriptions*

CODES

HESA Code	Description	Price Group
4	Anatomy and Physiology	B

JACS Code	Description	Percentage (%)
B821	The study of the principles and techniques in the use of radiation to provide medical diagnostic information.	