

**CDA4 Programme Design Template
Module specification**



University of the
West of England

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Current Applications of Hybrid Imaging Practice				
Module Code	UZYSQ6-15-M	Level	M	Version	1
Owning Faculty	Health & Life Sciences	Field	Allied Health Professions		
Contributes towards	MSc Nuclear Medicine				
UWE Credit Rating	15 credits	ECTS Credit Rating	7.5	Module Type	Project
Pre-requisites	None		Co- requisites	None	
Excluded Combinations	None		Module Entry requirements		
Valid From	October 2013		Valid to		

CAP Approval Date	9/7/13
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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"> • Identify the various components of hybrid imaging equipment and demonstrate an awareness of ongoing developments (<i>Component A, element 1</i>) • Justify the use of hybrid imaging technology and illustrate how such technology should be used in order to maximise both staff and patient safety (<i>Component A, elements 1 and 2</i>) • Appreciate the multidisciplinary aspects of hybrid imaging, demonstrating awareness for current and future developments in clinical practice (<i>Component A, element 1</i>) • Evaluate the range of radiation protection practices currently utilised within a hybrid imaging environment (<i>Component A, elements 1 and 2</i>) • Appraise a variety of methods of image acquisition, fusion and reconstruction in order to critique final image production (<i>Component A, elements 1 and 2</i>)

	<ul style="list-style-type: none"> • Critically evaluate the legislation governing the use of hybrid imaging technology including associated Radiopharmaceuticals (<i>Component A, element 2</i>) • Critically evaluate contemporary research within the hybrid nuclear medicine environment and demonstrate an overall understanding of the role of the modality within various patient pathways (<i>Component A, elements 1 and 2</i>) • Explore the multidisciplinary aspects of hybrid imaging and consider the impact this might have on patient treatment regimens (<i>Component A, elements 1 and 2</i>) • Appreciate Government strategies with regards to the current and future provision of hybrid imaging services (<i>Component A, elements 1 and 2</i>) • Critically evaluate current imaging techniques for hybrid imaging practice with reference to the role of the hybrid imaging practitioner (<i>Component A, element 1</i>) • Critically evaluate emerging/developing imaging techniques for hybrid imaging practice with reference to the role of the hybrid imaging practitioner (<i>Component A, element 1</i>) • Relate the appropriate scientific and technological principles of hybrid imaging to current models of nuclear medicine practice (<i>Component A, elements 1 and 2</i>)
Syllabus Outline	<p>SPECT/CT Equipment Including Safe Working Practice</p> <ul style="list-style-type: none"> • An introduction to imaging equipment commonly used with a hybrid imaging environment (including ancillary equipment) • Common image acquisition and processing techniques • Factors affecting image quality with consideration as to strategies designed to limit/rectify such occurrences • Common applications of hybrid imaging technique, with link to relevant legislation • SPECT/CT room design to incorporate safety considerations <p>PET/CT Equipment Including Safe Working Practice</p> <ul style="list-style-type: none"> • As above but considering PET/CT as opposed to SPECT/CT <p>Fundamental Imaging Parameters within the Hybrid Environment</p> <ul style="list-style-type: none"> • Fundamental acquisition parameters in hybrid imaging • Fundamental utilisation of Computed Tomography within the hybrid imaging environment • Radiation protection implications to be considered when performing a CT scan within the hybrid imaging environment, including compliance with current legislation • Fundamentals of CT multi-planar reconstruction • An introduction to the major components of a modern CT scanner • The development of fundamental quality control tests • Principle of SPECT/CT imaging as applied to cardiac, neurology and oncology imaging <p>Impact of Hybrid Imaging on Patient Management</p> <ul style="list-style-type: none"> • Care of the patient within the hybrid imaging environment including appropriate preparation and dosimetry considerations • Clinical value of hybrid imaging within current patient pathways • Clinical indications / applications for the use of SPECT/CT • Current national hybrid imaging guidelines and Government strategies

	<ul style="list-style-type: none"> • The future integration of hybrid imaging systems within radiotherapy practice • Further establishment of multidisciplinary roles within a hybrid imaging environment <p>Emerging Technology</p> <ul style="list-style-type: none"> • Justification and current thinking related to the use of Computed Tomography within the hybrid environment • Justification and current thinking related to the use of resolution recovery within the hybrid environment • The future production of radiopharmaceutical tracers required for hybrid Imaging Practice • An introduction to PET/MR, developing an appreciation of its current position in clinical practice and the growing knowledge base surrounding the clinical applications of the modality
Contact Hours	<p>Contact hours will be achieved through a blended learning approach that will include distance based education supplemented by knowledge exchange events. This distance based education will embrace the University's current vision associated with Technology Enhanced learning. Such learning will include but not be limited to, asynchronous delivery of lecture material through narrated presentations, notes and other guided reading, VLE discussion board forums with specific objectives, workplace tasks, and other study tasks deemed appropriate to the development of student knowledge. An approximated breakdown of these contact hours can be seen in the section below</p> <p>Formative feedback on allocated study tasks will be provided. Contact with the module leader for discussion of module related issues will be facilitated by e-mail, phone conversations and through interaction at the knowledge exchange events.</p>
Teaching and Learning Methods	<p>The learning and teaching strategy for this module has been developed to enable individuals to demonstrate a good level of understanding associated with the current applications of hybrid imaging practice. This will include such things as equipment design, safety, current training implications and the most effective use of this developing imaging modality. The module will also consider future development opportunities for the hybrid imaging practitioner and relate these to potential growth areas in clinical practice. These topics will provide the student with the opportunity to consider the developing role of the modality and how through appropriate use/optimisation it can be used to enhance overall diagnostic pathways.</p> <p>To ensure engagement in the module learning opportunities, assessment will be linked to involvement in and contribution to discussion boards where specific tasks will be set. The tasks will be constructed to ensure that the module learning outcomes must be addressed. Contributions to these tasks will form source material from which students may extract content to add to their case study/presentation. Experience from other modules using this format indicates the potential for valuable discussion relating to the module content and helps ensure timely engagement as opposed to leaving personal study and revision to the end of the module delivery. The capacity to engage in debate with peers helps to facilitate networking, peer/shared learning and knowledge exchange.</p> <p>A variety of teaching approaches will be utilised within the module.</p>

	<p>Scheduled learning will include upto 30 hours engaged with lectures, seminars, tutorials, discussion board entries, project supervision, work based learning.</p> <p>Independent learning will include upto 120 hours engaged with essential reading, case study preparation, presentation development and presentation construction and personal reflection on learning</p> <p>Additional student centred learning guided by tutorials and discussion will include</p> <ul style="list-style-type: none"> • Evaluation and discussion of current working practices • Consideration as to the future role of the Nuclear Medicine Practitioner
Key Information Sets Information	NA Postgraduate module
Reading Strategy	<p>The following reading strategy will be made available to all students via the module handbook displayed on BlackBoard</p> <p>Core Reading</p> <p>Any essential reading will be indicated clearly, along with the method for accessing it, e.g. students may be required to purchase a set text, be given a print study pack or be referred to texts that are available electronically through the Library. Module guides will also reflect the range of reading to be carried out.</p> <p>Further Reading</p> <p>Further reading will be required to supplement the set text and other printed readings. Students are expected to identify all other reading relevant to their chosen topic for themselves. They will be required to read widely using the library search facilities, a variety of bibliographic and full text databases, and Internet resources. Many of these resources can be accessed remotely. The purpose of this further reading is to ensure students are familiar with current research related to the ongoing development of the Nuclear Medicine profession.</p> <p>Access and Skills</p> <p>The development of literature searching skills is supported by the Library Services web pages which include interactive tutorials on search skills, the use of specific electronic library resources, evaluating information and various referencing styles. Students will be encouraged to access such resources in order to fully utilise the available range of online help. Further support will be provided by the module team again through the creation of narrated presentations.</p>
Indicative Reading List	<p>Recommended Textbooks:</p> <p>Bailey, D. (2005) <i>Positron Emission Tomography: Basic Sciences</i>. New York: Springer.</p> <p>Barrington, S.F., Maisey, M. and Wahl, R.L., (2006) <i>Atlas of Clinical Positron Emission Tomography</i>. 2nd Ed. London: Hodder Arnold.</p>

Christian, P. (2012) *Nuclear Medicine and PET/CT: Technology and techniques*. 7th ed. New York: Mosby Elsevier.

Delbeke, D. (2010) *Hybrid PET/CT and SPECT/CT imaging: A teaching file*, [online]. London: Springer. [Accessed 15 April 2013].

Kim, E. (2007) *Sectional anatomy: PET/CT and SPECT/CT*. [online] New York: Springer [Accessed 15 April 2013].

Moeller, T. (2007) *Pocket Atlas of Sectional Anatomy: Computed Tomography and Magnetic Resonance Imaging*. New York: Thieme.

Reiser, M. (2009) *Multislice CT*. 3rd Ed. London: Springer.

Schulthess, G. (2007) *Molecular Anatomic Imaging: PET-CT and SPECT-CT Integrated Modality*. Philadelphia: Lippincott Williams & Wilkins

Seeram, E. (2009) *Computed Tomography: Physical Principles, Clinical Applications, and Quality Control*. Edinburgh: Saunders.

Valk, P. (2006) *Positron Emission Tomography: Clinical Practice*. London: Springer.

Electronic Books

The university now has access to a number of e-based Nuclear Medicine books. This catalogue is expanding quickly and you are advised to search this resource regularly. Please use the UWE library portal for this

<http://www1.uwe.ac.uk/library/>

Journals Resources

Seminars in Nuclear Medicine
European Journal of Nuclear Medicine & Molecular Imaging
Journal of Nuclear Medicine
Clinical Nuclear Medicine
Nuclear Medicine Communications
Nuclear Medicine and Biology

All journals can be found using the library search on the library webpages (<http://www1.uwe.ac.uk/library/>). Off campus users will be able to access journal articles using their UWE username and password

Alternatively, you can search for articles using a database (see below for a list of suitable databases), which will provide search and display facilities.

Databases

Anatomy TV
Anatomy & Physiology Online
Cinahl
Cochrane
Embase
Medline

Recommended Background Articles

Mariani, G., et. al. (2010) A Review on the clinical uses of SPECT/CT. *European Journal of Nuclear Medicine and Molecular Imaging*. 37(10), pp. 1959-1985.

Bockisch, A., et. al. (2009) Hybrid Imaging by SPECT/CT and PET/CT: Proven Outcomes in Cancer Imaging. *Seminars in Nuclear Medicine*. 39(4), pp. 276-289.

Even-Sapir, E., et. al. (2009) Hybrid Imaging (SPECT/CT and PET/CT)—Improving the Diagnostic Accuracy of Functional/Metabolic and Anatomic Imaging. *Seminars in Nuclear Medicine*. 39(4), pp. 264-275.

Heusner, T., (2009) Diagnostic value of full-dose FDG PET/CT for axillary lymph node staging in breast cancer patients. *European Journal of Nuclear Medicine & Molecular Imaging*.36(10), pp. 1543-1550.

Seo, Y., et. al. (2008) Technological Development and Advances in Single-Photon Emission Computed Tomography/Computed Tomography. *Seminars in Nuclear Medicine*.38 (3), pp. 177 – 198.

Townsend, D. (2008) Positron Emission Tomography/Computed Tomography. *Seminars in Nuclear Medicine*. 38(3), pp. 152-166.

Marius, H. (2006) The Role of Single-Photon Emission Computed Tomography/Computed Tomography in Benign and Malignant Bone Disease. *Seminars in Nuclear Medicine*. 36(4), pp. 286-294.

Schillaci, O. (2006) Single-Photon Emission Computed Tomography/Computed Tomography in Lung Cancer and Malignant Lymphoma. *Seminars in Nuclear Medicine*. 36(4), pp. 275-285.

Websites:

<http://www.bnms.org.uk>

<http://www.eanm.org>

<http://www.childrenshospital.org/sites/Site2575/mainpageS2575P37.html>

<http://www.radquiz.com/Nucs-Teaching.htm>

<http://gamma.wustl.edu/allknown.html>

http://nuclearmedicine.stanford.edu/education/nuclear_teaching.html

Part 3: Assessment

Assessment Strategy

A 1500 word case study and a 10 minute audio narrated presentation will demonstrate achievement of the learning outcomes.

The 1500 word case study will enable the student to either

- 1) Consider their current departmental protocols linked to hybrid imaging and through reflective practice demonstrate the importance of the modality to current patient pathways.

Or

- 2) Discuss how the introduction of hybrid imaging within a Nuclear Medicine department might alter/enhance the patient pathway.

	<p>The audio narrated presentation will provide the student with the opportunity to critically evaluate the established and emerging roles of the hybrid imaging practitioner within current clinical practice. This may include discussion related to some of the following areas</p> <ul style="list-style-type: none"> • The appropriate use of Computed Tomography within the hybrid imaging environment • The development of cross-sectional anatomy skills for the Nuclear Medicine Practitioner • Radiation protection considerations for hybrid practice • Development of extended roles for the non-medical within hybrid imaging • The development of core competencies for hybrid practice <p>Discussion board activities will provide the opportunity for engagement with peer assisted learning and profession specific debate. Such activities will help consolidate hybrid imaging knowledge and provide a focus for the development of new ideas. Formative assessment related to these discussion board contributions will be provided by the module team and will highlight good student understanding and areas where further exploration and development might appear appropriate.</p>
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Identify final assessment component and element	Component A, element 2	
% weighting between components A and B (Standard modules only)	A:	B:
First Sit		
Component A Description of each element	Element weighting	
1) 1500 word case study	50%	
2) Audio narrated presentation	50%	
Component B Description of each element	Element weighting	

Resit (further attendance at taught classes is not required)		
Component A Description of each element	Element weighting	
1) 1500 word case study	50%	
2) Audio narrated presentation	50%	
Component B	Element weighting	

Description of each element	
<p>If a student is permitted an EXCEPTIONAL RETAKE of the module the assessment will be that indicated by the Module Description at the time that retake commences.</p>	