



ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Pathophysiological Sciences A				
Module Code	USSKL9-30-2	Level	2	Version	1
UWE Credit Rating	30	ECTS Credit Rating	15	WBL module?	No
Owning Faculty	Health and Applied Sciences	Field	Healthcare Science		
Department	Biological, Biomedical and Analytical Sciences	Module Type	Standard		
Contributes towards	FdSc Healthcare Science				
Pre-requisites	USSJT5-30-1 Scientific Basis of Life USSJT7-30-1 Pathophysiology of Disease USSJT8-30-1 Anatomy and Physiology	Co- requisites	None		
Excluded Combinations	None	Module Entry requirements	None		
First CAP Approval Date	2 February 2016	Valid from	September 2016		
Revision CAP Approval Date		Revised with effect from			

Part 2: Learning and Teaching	
Learning Outcomes	<p>On successful completion of this module students will be able to fulfil the learning outcomes from 2 of the following 5 Physiological Sciences themed units of study (assessment intended for each learning outcome designated by [*] corresponding to assessment section):</p> <p>1. Cardiac Physiology A</p> <ul style="list-style-type: none"> • Know and use in context the abbreviations and units used in Cardiac Physiology [A1, B1] • Describe the concept of “normal” and the calculation and use of normal ranges in the interpretation of cardiac investigations and demonstrate the ability to apply these to clinical situations [A1, B1] • Recognise the normal physiological variability in humans [A1] • Explain the need for calibration and quality assurance for all measurements undertaken in Cardiac Physiology [A1] • Explain the clinical framework for, and basic principles of: clinical electrocardiography; the normal electrocardiogram from birth to old age; common arrhythmias; interpretation of electrocardiograms [A1, B2] • Recognise life-threatening arrhythmias [A1] • Outline management of common arrhythmias (e.g. AT/VT) [A1]

	<p>2. Respiratory & Sleep Physiology A</p> <ul style="list-style-type: none"> • Know and apply the abbreviations and units used in Respiratory and Sleep Science [A1] • Explain the concept of “normal” and the calculation, use and limitations of reference values, reference ranges, Lower Limits of Normal (LLN) and standardized residuals [A1] • Explain the normal physiological variability in humans in a range of tests from birth to old age [A1, B1] • Describe the generation and use of reference ranges to define normal and abnormal lung function and apply knowledge to calculate reference ranges, LLN and Standardized residuals [A1] • Explain the need for calibration and quality assurance for all measurements undertaken in Respiratory and Sleep Science [A1, B1] • Explain the application of dynamic lung volumes and flows in routine clinical practice and analyse data [A1, B1, B2] • Compare different techniques to estimate lung volumes and the limitations of each technique [A1, B1] • Discuss the role and application of inhaled drug therapy (Bronchodilators) in the management of respiratory disease [A1] <p>3. Applied Anatomy & Physiology</p> <ul style="list-style-type: none"> • Describe the anatomy and physiology of the auditory and visual systems • Discuss physiological principles and their importance in health and disease with particular emphasis on conditions in patients commonly referred to clinical neurophysiology • Investigate the principles of drug action and pharmacokinetics and correlate these to drug therapy with particular emphasis on conditions in patients commonly referred for clinical neurophysiology investigations <p>4. Pathophysiology of CVRS</p> <ul style="list-style-type: none"> • Understand major abnormalities of physiological control mechanisms in diseases of the Cardiac, Vascular and Respiratory systems [A2] • Explain cellular, tissue and systems responses to diseases of the Cardiac, Vascular and Respiratory systems concentrating on disorders of growth, tissue responses to injury, cell death, inflammation, neoplasia, normal and abnormal immune responses, atheroma, thrombosis, embolism and infarction [A2, B2] • Describe the basis of common infections of the Cardiac, Vascular and Respiratory systems [A2, B2] • Describe common diseases that affect the Cardiac, Vascular, Respiratory and Sleep Physiology [A2] • Gain an awareness of primary and secondary autonomic disorders [A2] <p>5. Measurement Techniques</p> <ul style="list-style-type: none"> • Discuss the effects of amplifier characteristics on the quality of the recorded signal, and their influence on recording methodology [A2] • Discuss the operation, specification, advantages and limitations of filters [A2] • Outline the principles of signal digitisation [A2] • Explore the methods and applications of computer acquisition, storage, and analysis of signals in clinical physiology [A2] • Explain the principles and methods of electrophysiological measurement [A2, B2] • Explain the principles and methods of psychophysical measurement [A2, B2] • Investigate principles and applications of biomedical imaging techniques [A2]
Syllabus Outline	<p>Students will study an appropriate combination of 2 from the following 5 themed units of study:</p> <p>1. Cardiac Physiology A</p> <ul style="list-style-type: none"> • Clinical Electrocardiography • Development of a framework for interpretation of Electrocardiograms

- The Normal Electrocardiogram from birth to old age
- Recognition of life threatening arrhythmias
- Recognition of:
 - Common arrhythmias
 - The effect of myocardial infarction and ischaemia on the electrocardiogram
- Management of common arrhythmias.

2. Respiratory & Sleep Physiology A

- Pathophysiological basis of changes in lung function tests observed in common lung diseases.
- Pharmacology – basic principles (receptors, pharmacodynamics, pharmacokinetics)
- Lung Functions in context – Clinical History, X-Rays, HRCT, Blood Tests
- Assessing Lung Function – which test for which question?
- Techniques used in the assessment of lung function
- Reference ranges, LLN and SR's
- Reporting Results
- Dynamic Lung Volumes and Flows
- Reversibility Testing

3. Applied Anatomy & Physiology

- Anatomy of the ear and overview of pathophysiology, clinical and practical aspects of central, peripheral and vestibular disorders
- Anatomy of the eye and ocular adnexae
- Body fluids, renal and circulatory systems, subdivisions, volumes, composition
- Microcirculation
- Lymphatic system
- Pathophysiology of common conditions affecting the central and peripheral nervous system
- Therapeutics: Pharmacology; Surgical interventions; Biofeedback mechanisms and treatments; Mechanical or electrical interventions; Counselling
- Mental disorders

4. Pathophysiology of Common Cardiovascular and Respiratory Conditions

- Cellular, tissue and systems response to common Cardiac, Vascular and Respiratory diseases.
- Basis of common infections affecting the Cardiac, Vascular and Respiratory systems.
- Common diseases of the Cardiac, Vascular and Respiratory system including the epidemiology, public health and psychosocial aspects including:
- Cardiac Disease: Ischaemic heart disease and myocardial infarction; Acquired valvular disease; Hypertensive heart disease; Cardiomyopathy; Congenital heart disease; Autonomic disorders; Heart failure
- Vascular Disease: Peripheral arterial disease; Venous disease;
- Cerebrovascular disease
- Respiratory Diseases: Chronic obstructive pulmonary disease; Asthma; Restrictive lung disease; Congenital and genetic lung conditions; Pneumonia; Lung cancer; Pulmonary Vascular Disorders; Cystic fibrosis; Obstructive sleep apnoea; Central sleep apnoea; Respiratory muscle disorders; Occupational lung disease
- The role of respiratory mechanics in control of breathing; Effect of neuromuscular disease on the respiratory system
- Impact of smoking on health; common risk factors for cardiovascular disease; the concept of risk assessment.

5. Measurement Techniques

- Instrumentation: Electronic circuits; Amplifiers; Noise; Filters; Digitisation; Biological and non-biological artefacts; Principles of calibration and

	<ul style="list-style-type: none"> • maintenance of test equipment following national and international standards • Medical Imaging • Basic principles and methods of electrophysiology • Basic principles and methods of psychophysics, psychoacoustics and sound perception
Contact Hours	<p>There will be 2 weeks of contact time at UWE in 2 x 1 week blocks. Included in each block week are laboratory workshops, lectures and tutorials. The contact time will equate to approximately 12 hours per block (a total of 24 hours).</p> <p>In addition to the allocated hours on campus learning, students will engage in synchronous and asynchronous online learning. This will comprise a total of approximately 48 hours of online engagement through a combination of lectures, synchronous online tutorials, synchronous and asynchronous discussions, online quizzes, and collaborative group work.</p>
Teaching and Learning Methods	<p>Students are expected to spend 72 hours on scheduled learning and 228 hours on independent learning. Theoretical material within the module will be presented to the students in the form of regular lectures throughout each of the semesters in the academic year. During those times of work based learning, these lectures will be delivered online and involve a number of technological enhancements. The learning of lecture content will be reinforced through time spent in independent learning by the directed reading of recommended texts and through the use of technology enhanced learning resources that will be provided online. This online learning and engagement will be delivered through several avenues:</p> <ul style="list-style-type: none"> • Synchronous online tutorials in protected learning time where the student will contribute/attend an online activity appropriate to the content at the time at which the academic will be present online to facilitate and lead this scheduled/timetabled session. This tutorial will be themed/planned. • Asynchronous discussions in the student's own time (or during protected time where permitted and appropriate) where they will engage/collaborate with other students on the course or in specified groups, and in which the academic is permitted to moderate where necessary, but is not expected to contribute. • Synchronous surgery sessions timetabled for a specific time in which the academic will be available online to answer live questions via discussion boards/blogs/collaborate or to respond to questions posted/asked prior to the session. • Interactive, online formative quizzes made available either following a particular package of knowledge exchange/learning, or in specified sessions/time periods. • Lectures delivered online through a combination of one or more of the following: visual/audio/interactivity/personal formative assessment <p>Practical classes will include simulated case-study based investigations which will allow students to develop their analytical, interpretive and data handling skills.</p> <p>The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission [B1, B2, B3], and undertaking revision for the controlled component [A1, A2].</p> <p>Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop.</p> <p>Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below. Scheduled sessions may vary slightly depending on the module choices you make.</p>
Key Information Sets Information	<p>Key Information Sets (KIS) are produced at programme level for all programmes that this module contributes to, which is a requirement set by HESA/HEFCE. KIS are comparable sets of standardised information about undergraduate courses allowing</p>

prospective students to compare and contrast between programmes they are interested in applying for.

Key Information Set - Module data				
<i>Number of credits for this module</i>				30
Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Placement study hours	Allocated Hours
300	72	228	0	300

The table below indicates as a percentage the total assessment of the module which constitutes a -

Written Exam: Unseen written exam, open book written exam, In-class test

Coursework: Written assignment or essay, report, dissertation, portfolio, project

Practical Exam: Oral Assessment and/or presentation, practical skills assessment, practical exam

Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description:

Total assessment of the module:	
Written exam assessment percentage	50%
Coursework assessment percentage	50%
Practical exam assessment percentage	0%
	100%

Reading Strategy

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.

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 or sold a print study pack or be referred to texts that are available electronically, etc. This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders.

If **further reading** is expected, this will be indicated clearly. If specific texts are listed, a clear indication will be given regarding how to access them and, if appropriate, students will be given guidance on how to identify relevant sources for themselves, e.g. through use of bibliographical databases.

A detailed reading list will be made available through relevant channels, e.g. module handbooks, Blackboard, etc.

Indicative Reading List

Cardiac A

Bennett, D.H. (2006) *Cardiac Arrhythmias: Practical notes on interpretation and treatment*. 7th ed. Oxford: Blackwell Publishers.

Davey, P. (2008) *ECGs at a Glance*. Oxford: Blackwell Publishers.

Jenkins, D. and Gerred, S. (2011) *ECGs by Example*. 7th ed. Edinburgh: Churchill Livingstone.

Remedica Medical Education and Publishing (2011) *ECG Pocket Reference UK*. Version 1.041. Free App for iPhone

Respiratory & Sleep A

Cotes, J.E., Chinn, D.J. and Miller, M.R. (2006) *Lung Function*. 6th ed. Oxford: Blackwell Publishers.

Gibson, G.J. (2009) *Clinical Tests of Respiratory Function*. 3rd ed. London: Hodder Arnold.

Newall, C., Evans, A., Lloyd, J., Shakespeare, J. and Carter, R. *ARTP Handbook in Spirometry*. 2nd ed. Association of Respiratory Technology & Physiology.

The ARTP Practical Handbook of Respiratory Function Testing – Part 1. 2nd ed. (2003) Association of Respiratory Technology & Physiology.

The ARTP Practical Handbook of Respiratory Function Testing - Part 2. (2005) Association of Respiratory Technology & Physiology.

Applied Anatomy & Physiology

Nair, M. and Peate, I (eds.) (2013) *Fundamentals of Applied Pathophysiology: An Essential Guide for Nursing & Healthcare Students*. Ames: Wiley-Blackwell.

Fox, S.I (2011) *Human physiology*. New York: McGraw-Hill.

Braun, C.A. (2011) *Pathophysiology: A Clinical Approach*. Philadelphia: Lippincott Williams & Wilkins.

McKinley, M.P. (2013) *Anatomy & physiology: an integrative approach*. New York: McGraw-Hill

Møller, A. (2011) *Hearing: Anatomy, Physiology, and Disorders of the Auditory System*. Plymouth: Plural Publishing.

Rang, H.P. and Dale, M.M. (2012) *Rang and Dale's pharmacology*. 7th ed. Cambridge: Elsevier.

Pathophysiology of CVRS

Lumb, A.B. (2010) *Nunn's Applied Respiratory Physiology*. 9th ed. Edinburgh: Churchill Livingstone.

Nobel, A., Johnson, R., Thomas, A. and Bass, P. (2010) *The Cardiovascular System: Basic Science and Clinical Conditions*. 9th ed. Edinburgh: Churchill Livingstone.

Shneerson, J.M. (2005) *Sleep Medicine*. 2nd ed. Oxford: Blackwell Publishers.

The ARTP Practical Handbook of Respiratory Function Testing – Part 1. 2nd ed. (2003) Association of Respiratory Technology & Physiology.

West J.B. (2012) *Respiratory Physiology: The Essentials*. 9th ed. Philadelphia: Lippincott Williams & Wilkins.

Measurement Techniques

Webster, J.G. (2014) *The Physiological Measurement Handbook*. CRC Press.

Davidovits, P. (2012) *Physics in Biology and Medicine*. Academic Press.

Christe, B. (2009) *Introduction to Biomedical Instrumentation: The Technology of Patient Care*. Cambridge: Elsevier.

Khandpur, R.S. (2004) *Biomedical Instrumentation: Technology and Applications*. New York: McGraw-Hill.

Biomedical Instrumentation & Technology, Instrumentation Science & Technology. Laboratory Investigation (Online journal), Physiological Measurement (Online journal) <http://iopscience.iop.org/0967-3334>

Part 3: Assessment

Assessment Strategy

The Assessment Strategy has been designed to support and enhance the development of both subject-based and more general skills, whilst ensuring that the modules learning outcomes are attained, as described below.

Component A

The written exam will provide students with an opportunity to demonstrate both their knowledge on a broad range of topics through a series of short essay questions.

Continuous assessment will be provided by the use of 3 x 30 minute online activities embedded in the module. These activities will require UWE login. The module leader will have full access to up-to-date data to monitor progress and marks obtained by students. Feedback at this level will also be provided online and will be by review of the tests after they have been completed and will include the correct answers (after the relevant assessment period has concluded).

The design of these online assessed activities will be varied, for example:

- Timed essay questions
- Label the structure
- Prioritisation structure
- Scenario based questions

Component B

The first element will be an independent case study of direct relevance to the student's employment, which is to be prepared and presented for assessment as an oral presentation during a block attendance at university.

The second element is a contextual review of a recent article related to diagnostic advance(s) in a technique(s) of relevance to the student's employment, the content of which will be negotiated with the appropriate academic tutor.

Formative feedback is available to students throughout the module through group discussions, and in workshops. Students are provided with formative feed-forward for their exam through a revision and exam preparation session prior to the exam and through the extensive support materials supplied through Blackboard.

All work is marked in line with the Department's Generic Assessment Criteria and conforms to university policies for the setting, collection, marking and return of student work. Where an individual piece of work has specific assessment criteria, this is supplied to the students when the work is set.

	<p>This assessment strategy has been designed following best practice on effective assessment from JISC (http://www.jisc.ac.uk/whatwedo/programmes/elearning/assessment/digiassess.aspx) and The Open University's Centre for Excellence in Teaching and Learning (http://www.open.ac.uk/opencetl/centre-open-learning-mathematics-science-computing-and-technology/activities-projects/e-assessment-learning-the-interactive-comp).</p> <p>Technical design and deployment of the activities will also follow best practice developed at UWE by the Education Innovation Centre in collaboration with academic colleagues across the university. Staff guidance and support are already in place (http://info.uwe.ac.uk/online/Blackboard/staff/guides/summative-assessments.asp).</p>
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Identify final assessment component and element	Component B2	
% weighting between components A and B (Standard modules only)	A:	B:
	50	50
First Sit		
Component A (controlled conditions) Description of each element	Element weighting (as % of component)	
1. Examination (1.5 hours)	50%	
2. 3 x 30 minute online activities embedded in the learning process	50%	
Component B Description of each element	Element weighting (as % of component)	
1. Case study oral presentation (15 minutes)	50%	
2. Short contextual review (1000 words)	50%	

Resit (further attendance at taught classes is not required)		
Component A (controlled conditions) Description of each element	Element weighting (as % of component)	
1. Examination (3 hours)	100%	
Component B Description of each element	Element weighting (as % of component)	
1. Case study oral presentation (15 minutes)	50%	
2. Short contextual review (1000 words)	50%	
<p>If a student is permitted a retake of the module under the University Regulations and Procedures, the assessment will be that indicated by the Module Description at the time that retake commences.</p>		