MODULE SPECIFICATION

Part 1: Information			
Module Title	Pathophysiological Sciences A		
Module Code	USSKL9-30-2	Level	Level 5
For implementation from	2020-21		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	Anatomy and Physiology 2020-21, Introduction to Physiological Sciences and Patient Care 2020-21, Scientific Basis of Life 2020-21		
Excluded Combinations	None		
Co- requisites	Pathophysiological Sciences B 2020-21		
Module Entry requirements	None		

Part 2: Description

Overview: This module explores the various aspects of pathophysiological sciences and contains five distinct units, namely

Unit 1: Cardiac Physiology A
Unit 2: Respiratory and Sleep Physiology A
Unit 3: Applied Neurophysiology and pathophysiology
Unit 4: Pathophysiology of CVRS and physiological measurement
Unit 5: Measurement Techniques

Students complete two of these units as prescribed by their pathway, namely

Cardiac Physiology: Units 1 and 4
Respiratory and Sleep Physiology: Units
Neurophysiology: Units 3 and 5

Pre-requisites: students must have passed USSJT5-30-1 Scientific Basis of Life, USSKA9-30-1 Introduction to Physiological Sciences and Patient Care, USSJT8-30-1 Anatomy and Physiology.

Co-requisites: USSKLA-30-2 Pathophysiological Sciences B

Educational Aims: See learning outcomes.

Outline Syllabus: Cardiac Physiology A (Cardiac Physiology pathway):

Clinical Electrocardiography
Development of a framework for interpretation of lectrocardiograms
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.

Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway):

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

CVRS Pathophysiology B (All pathways expect Neurophysiology):

Cardiac Disease: Ischaemic heart disease and myocardial infarction; Acquired valvular disease; Hypertensive heart disease; Cardiomyopathy; Congenital heart disease; Autonomic disorders; Heart failure

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

Applied Neurophysiology and pathophysiology (Neurophysiology pathway):

Anatomy of the central and peripheral nervous systems
Pathophysiology if common conditions affecting the central and peripheral nervous system
Genetic basis of diseases of the central nervous system Immunological basis of diseases of the central nervous system
Pathophysiology of mental illness, including epilepsy, major depression, psychosis, schizophrenia,
ADHD, and autism spectrum disorder
Infections of the brain and spinal cord, including meningitis and encephalitis
Pathophysiology of neurodegenerative diseases
Pharmacological interventions and drug therapy in the central nervous system
Non-pharmaceutical treatments of the central nervous system, including diet, surgery and cognitive behavioural therapy

Measurement Techniques:

Basics of Instrumentation: Electronic circuits; Amplifiers; Noise; Filters; Digitisation; Biological and nonbiological artefacts; Principles of calibration and maintenance of test equipment following

national and international standards
Medical Imaging, including Magnetic Resonance Imaging and Positron Emission Tomography
Basic principles and methods of psychophysics, psychoacoustics and sound perception
Basic principles and methods of electrophysiology

Teaching and Learning Methods: There will be 3 weeks of contact time at UWE in 3 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 36 hours).

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 36 hours of online engagement through a combination of lectures, synchronous online tutorials, synchronous and asynchronous discussions, online quizzes, and collaborative group work.

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:

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.

If possible (due to COVID-19 restrictions), a number of relevant practical sessions will be incorporated during the campus based blocks in addition to the work based learning that must be achieved under supervision by a workplace supervisor. Practical sessions will both drive hands on learning and the acquisition of technical skills at both an individual and group working level. If onsite Block Weeks are not possible due to COVID-19, these sessions will be delivered as online workshops and lectures/tutorials.

The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission, and undertaking revision for the exams.

Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion. These sessions constitute an average time per level. Scheduled sessions may vary slightly depending on the module choices you make.

Part 3: Assessment

The assessments within this module have been designed to show that the student has developed the required knowledge and clinical skills required to practice as a cardiac physiologist, respiratory and sleep physiologist or neurophysiologist, as appropriate. There will two components to the assessment of this module.

Component A
The in-class 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. The in-class open book test will assess the students' ability to research relevant information and provide critical thinking in a variety workplace scenarios where the application of knowledge is required.

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, or online if this is not possible. 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 Faculty'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.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		25 %	Short contextual review (1000 words)
Presentation - Component B		25 %	Case study oral presentation (15 minutes)
In-class test - Component A		25 %	In-class open book test (1.5. Hours)
In-class test - Component A	✓	25 %	In-class written examination (1.5 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		25 %	Short contextual review (1000 words)
Presentation - Component B		25 %	Case study oral presentation (15 minutes)
Examination (Online) - Component A	✓	50 %	Online examination (24 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	Reference
Cardiac Physiology A (Cardiac Physiology pathway) - Know and use in context the abbreviations and units used in Cardiac Physiology	MO1
Cardiac Physiology A (Cardiac Physiology pathway) - 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	MO2
Cardiac Physiology A (Cardiac Physiology pathway)- Recognise the normal physiological variability in humans	MO3
Cardiac Physiology A (Cardiac Physiology pathway) - Explain the need for calibration and quality assurance for all measurements undertaken in Cardiac Physiology	MO4
Cardiac Physiology A (Cardiac Physiology pathway) - Explain the clinical framework for, and basic principles of: clinical electrocardiography; the normal electrocardiogram from birth to old age; common arrhythmias; interpretation of electrocardiograms	MO5
Cardiac Physiology A (Cardiac Physiology pathway) - Recognise life-threatening arrhythmias - Know and apply the abbreviations and units used in Respiratory and Sleep Science	MO6
Cardiac Physiology A (Cardiac Physiology pathway) - Outline management of common arrhythmias (e.g. AT/VT)	MO7
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Know and apply the abbreviations and units used in Respiratory and Sleep Science	MO8
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Explain the concept of "normal" and the calculation, use and limitations of reference values, reference ranges, Lower Limits of Normal (LLN) and standardized residuals	MO9
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Explain the normal physiological variability in humans in a range of tests from birth to old age	MO10
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - 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	MO11
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Explain the need for calibration and quality assurance for all measurements undertaken in Respiratory and Sleep Science	MO12
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Explain the application of dynamic lung volumes and flows in routine clinical practice and analyse data	MO13
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Compare different techniques to estimate lung volumes and the limitations of each technique	MO14
Respiratory and Sleep Physiology A (Respiratory and Sleep Physiology pathway) - Discuss the role and application of inhaled drug therapy (Bronchodilators) in the management of respiratory disease	MO15
Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Understand major abnormalities of physiological control mechanisms in diseases of the Cardiac, Vascular and Respiratory systems	MO16
Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) -Explain cellular, tissue and systems responses to diseases of the Cardiac, Vascular and Respiratory systems	MO17
Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) -Describe the basis of common infections of the Cardiac, Vascular and Respiratory systems	MO18

	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Describe common diseases that affect the Cardiac, Vascular, Respiratory and Sleep Physiology	MO19
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Describe treatment strategies for Cardiovascular and respiratory system disorders	MO20
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Gain an awareness of primary and secondary disorders	MO21
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Discuss the effects of amplifier Characteristics on the quality of the recorded signal, and their influence on recording methodology	MO22
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Discuss the operation, specification, advantages and limitations of filters	MO23
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Outline the principles of signal digitisation	MO24
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Explore the methods and applications of computer acquisition, storage, and analysis of signals in clinical physiology	MO25
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Explain the principles and methods of electrophysiological measurement	MO26
	Pathophysiology of CVRS and physiological measurement (All pathways expect Neurophysiology) - Investigate principles and applications of biomedical imaging techniques	MO27
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Recall the normal structure and function of the brain and spinal cord	MO28
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Explain the epidemiology of commonly referred pathophysiology to clinical neurophysiology services	MO29
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Describe the types of genetic error responsible for common abnormalities affecting the brain and spinal cord	MO30
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Discuss the immunological basis of diseases, with particular emphasis on conditions in patients commonly referred to clinical neurophysiology	MO31
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Describe major abnormalities of physiological control mechanisms in diseases of the brain and spinal cord	MO32
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Describe cellular, tissue and systems responses to diseases of the brain and spinal cord, e.g. brain haemorrhage, cerebral infarction, brain tumours and dementia	MO33
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Describe the basis of common infections of the brain and spinal cord, e.g. meningitis, encephalitis, brain abscess	MO34
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Describe the principles of drug action and pharmacokinetics and correlate these to drug therapy, with specific reference to conditions in patients commonly referred to clinical neurophysiology services	MO35
	Applied Neurophysiology and pathophysiology (Neurophysiology pathway) - Discuss the principle non-pharmaceutical treatments relevant to patients commonly referred to clinical neurophysiology to include diet, surgery and cognitive behavioural therapy	MO36
	Measurement Techniques - Discuss the effects of amplifier characteristics on the quality of the recorded signal,and their influence on recording methodology	MO37
	Measurement Techniques - Discuss the operation, specification, advantages and limitations of filters	MO38
	Measurement Techniques - Outline the principles of signal digitisation	MO39
	Measurement Techniques - Explore the methods and applications of computer acquisition, storage, and analysis of signals in clinical physiology	MO40

	Measurement Techniques - Explain the principles and methods of electrophysiological measurement	MO41
	Measurement Techniques - Explain the principles and methods of psychophysical measurement	MO42
	Measurement Techniques - Investigate principles and applications of biomedical imaging techniques	MO43

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	228
	Total Independent Study Hours:	228
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	72
	Total Scheduled Learning and Teaching Hours:	72
	Hours to be allocated	300
	Allocated Hours	300
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/usskl9-30-2.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: