



Module Specification

Advanced Cardiac Physiology and Neurophysiology

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Part 1: Information

Module title: Advanced Cardiac Physiology and Neurophysiology

Module code: USSJY3-30-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Delivery locations: Not in use for Modules

Field: Applied Sciences

Module type: Module

Pre-requisites: Cardiovascular Physiology and Pathophysiology A 2023-24, Cardiovascular Physiology and Pathophysiology B 2023-24, Pathophysiological Sciences A 2023-24, Pathophysiological Sciences B 2023-24

Excluded combinations: None

Co-requisites: Applied Neurophysiology, Respiratory and Sleep Physiology 2023-24

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Pre-requisites: students must have taken USSKAW-30-2 Cardiac Physiology and Pathophysiology A and USSKAX-30-2 Cardiac Physiology and Pathophysiology B

OR

USSKL9-30-2 Pathophysiological Sciences A and USSKLA-30-2 Pathophysiological Sciences B

Features: Module Entry requirements: Level 5 (or equivalent) physiological sciences qualification

Educational aims: On successful completion of this module students will be able to fulfil the learning outcomes from 1 of the following 2 Physiological Sciences themed units of study:

Unit 1: Advanced Cardiac Physiology

Unit 2: Advanced Neurophysiology

Unit 1 aligns to the Healthcare Science (Physiological Sciences) Cardiac Physiology pathway. Unit 2 aligns to the Healthcare Science (Physiological Sciences) Neurophysiology pathway. (See Learning Outcomes).

Outline syllabus: This module contains two distinct units, namely

Unit 1: Advanced Cardiac Physiology

Unit 2: Advanced Neurophysiology

Students complete one of these units as prescribed by their pathway. Unit 1 aligns to the Healthcare Science (Physiological Sciences) Cardiac Physiology pathway. Unit 2 aligns to the Healthcare Science (Physiological Sciences) Neurophysiology pathway.

The syllabus covers:

1. Advanced Cardiac Physiology (Cardiac Physiology pathway)

Cardiac Pacing:-

Basic electrophysiological concepts underlying pacing

Cardiac cycle and potentials

Equipment and set up

Principles and application of rhythm management devices

Pacing modes, codes, and timing cycles

Indications and techniques for permanent and temporary pacing

Haemodynamics of cardiac pacing

Indications and contraindications for device implantation

Implantation techniques and asepsis, and removal

Follow up assessment of pacemaker patients and troubleshooting

Principles and applications for use of Implantable cardioverter defibrillators and cardiac resynchronisation therapy

Introduction to echocardiography:-

The principles of ultrasound and echo modes

Introduction to windows and views, velocities and pressures

Indications for echo

Utilising echocardiography to assess pathophysiological cardiac conditions

Congenital heart disease:-

Paediatric ECG interpretation

Embryology

Circulatory changes at birth

Simple and complex cardiac abnormalities including: Atrial Septal Defects, Ventricular Septal Defects, Patent Ductus Arteriosus, Coarctation of the Aorta, Tetralogy of Fallot, Complex pathologies, Treatment and management

Physiology, pathophysiology and pharmacology relating to Inherited, Genetic and Acquired Heart conditions and cardiac output control

Pharmacology:-

Be able to describe and evaluate the mechanism of action and indications for cardiovascular drugs for a range of applications including: Hypertension, Heart failure, Anti-coagulants /anti-platelet, Inotropes, Rhythm control, Cardiac catheterisation lab pharmacology, Dyslipidaemias

Additionally, it is expected that students will integrate knowledge from both this unit

and the co-requisite USSJY4- 30-3 Applied Cardiac Physiology module in order to fully understand the scientific basis and diagnosis of cardiac conditions.

2. Advanced Neurophysiology (Neurophysiology pathway)

Neuroanatomy and physiology and pathophysiology

Major and subdivisions of the brain

Peripheral nervous system: cranial and peripheral nerves, neuropathies and myopathies, roots and muscles

Embryology: neural tube, origins of neurones and glia, neural crest, cell migration, formation of brain and spinal cord, myelination

Cerebral circulation: control of cerebral circulation, effect of altered blood gases, measurement of cerebral

blood flow, CSF production, constituents, circulation and pressure

Functions of subcortical structures: extrapyramidal and pyramidal systems, cerebellum and related pathways, disorders of movement

Neurological conditions, their pathology and treatment: epilepsy classification, treatment, infective, degenerative, cerebrovascular, space-occupying lesion (SOL), metabolic, demyelinating conditions, non-organic disorders

Psychology of disease

Psychosocial

Psychological

Additionally, it is expected that students will integrate knowledge from both this unit and the Applied Neurophysiology unit within the co-requisite USSJYC-30-3 module in order to fully understand the scientific basis and diagnosis of neurophysiological conditions.

Part 3: Teaching and learning methods

Teaching and learning methods: Material within the module will be presented to the students in the form of lectures, clinical workshops and tutorials. These will be held in block weeks at certain points within semesters 1 and 2. The learning of lecture content will be reinforced by regular tutorials throughout the academic year, and 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.

A number of relevant clinical sessions will be incorporated during the block teaching, in addition to the work based learning that must be achieved under supervision by a workplace supervisor. Clinical sessions will drive the acquisition of technical skills at both an individual and group working level.

The remainder of the independent learning time allocated to the module should be spent preparing for assessments (B1), and undertaking revision for the exam (A1).

Scheduled learning includes lectures, seminars, tutorials, clinical workshops, external visits, work based learning.

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.

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

MO1 Advanced Cardiac Physiology (Cardiac Physiology pathway): Discuss the key areas of physiology, pathophysiology and pharmacology related cardiac pacing, including bradycardia management

MO2 Advanced Cardiac Physiology (Cardiac Physiology pathway): Discuss the key areas of physiology, pathophysiology and pharmacology relating to acquired and inherited cardiac abnormalities and their treatment and management

MO3 Advanced Cardiac Physiology (Cardiac Physiology pathway): Discuss the differences between children and adults with respect to cardiac physiology and pathophysiology, with reference to a range of disease pathologies

MO4 Advanced Cardiac Physiology (Cardiac Physiology pathway): Actively seek accurate and validated information from all available sources with respect to cardiac investigations

MO5 Advanced Cardiac Physiology (Cardiac Physiology pathway): Select and apply appropriate analysis or assessment techniques and tools

MO6 Advanced Cardiac Physiology (Cardiac Physiology pathway): Critically discuss the problems associated with the care of patients undergoing cardiac investigations or treatments

MO7 Advanced Neurophysiology (Neurophysiology pathway): Describe the physiology of the blood–brain barrier and the cerebrospinal fluid (CSF) circulatory system

MO8 Advanced Neurophysiology (Neurophysiology pathway): Explain the relationship between the dysfunction of subcortical structures and neurological symptomology

MO9 Advanced Neurophysiology (Neurophysiology pathway): Evaluate the current definition, classification and treatment of adult epilepsy

MO10 Advanced Neurophysiology (Neurophysiology pathway): Appraise common neurological conditions and the evidence base that underpins treatment decisions

MO11 Advanced Neurophysiology (Neurophysiology pathway): Evaluate the effect of levels of awareness and an abnormally altered patient psyche on the reliable measurement of physiological variables

MO12 Advanced Neurophysiology (Neurophysiology pathway): Describe a range of neurological conditions, their pathology and treatment for which the EEG and evoked potentials have a diagnostic or monitoring role

MO13 Advanced Neurophysiology (Neurophysiology pathway): Critically appraise the assessment and management needs of particular specialist

populations in Neurophysiology, to include the challenges of ageing, dementia, culture and language

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 225 hours

Face-to-face learning = 75 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ussjy3-30-3.html) via the following link <https://uwe.rl.talis.com/modules/ussjy3-30-3.html>

Part 4: Assessment

Assessment strategy: 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 or neurophysiologist, as appropriate. There will be two assessments of this module.

Assessment 1 is a set exercise. This set exercise will assess a broad knowledge base, and focus on data analysis and interpretation of clinical scenarios and case based material, in order to assess the understanding and application of specialist clinical knowledge.

Assessment 2 is an integrated case-study portfolio, which will include completion of a range of relevant clinical tasks undertaken in clinical workshops. The focus of the clinical workbook will be to analyse, assess, and interpret clinical data and patient scenarios. This is an essential requirement of a healthcare science practitioner.

Formative feedback is available to students throughout the module through group discussions, and in workshops. Students are provided with formative feed-forward

for their set exercise through a revision and test preparation session and through the extensive support materials supplied through Blackboard.

Assessment components:**Set Exercise (First Sit)**

Description: Set Exercise

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO10, MO12, MO13, MO2, MO3, MO4, MO5, MO6, MO7, MO8, MO9

Written Assignment (First Sit)

Description: Integrated case study portfolio (Cardiac), integrated case study (Neurophysiology)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO10, MO11, MO12, MO13, MO2, MO3, MO4, MO5, MO6, MO9

Set Exercise (Resit)

Description: Set Exercise

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO10, MO12, MO13, MO2, MO3, MO4, MO5, MO6, MO7, MO8, MO9

Written Assignment (Resit)

Description: Integrated case study portfolio (Cardiac), integrated case study (Neurophysiology)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO10, MO11, MO12, MO13, MO2, MO3, MO4, MO5, MO6, MO9

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Healthcare Science (Cardiac Physiology) {Apprenticeship-UWE}

[Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Healthcare Science (Neurophysiology) {Apprenticeship-UWE}

[Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22