



MCAST

MQF Level 6

Bachelor of Science (Honours) Health Science (Physiological Measurements)

AS6-03-21

Course Specification

Course Description

This programme is intended for students who wish to pursue studies which will provide them with the appropriate competences for the measurement and imaging of the human body's physiological activity. Scientists qualified in this field team up with various other health professionals and provide the diagnostic information which is vital to the medical profession in the treatment of several medical conditions.

This three-year course will provide the learner with the knowledge, clinical training and skills necessary to gain the professional qualifications required to work as a healthcare science practitioner in the area of clinical physiology.

Programme Learning Outcomes

At the end of the programme the learner will be able to:

N/A

Entry Requirements

MCAST Advanced Diploma for Pharmacy Technicians

or

MCAST Advanced Diploma in Health Sciences

or

2 A-Level passes and 2 I-Level passes

Compulsory A-Level: Biology

Preferred: Chemistry, Physics

Current Approved Programme Structure

Unit Code	Unit Title	ECVET/ECTS	Year
ASHTS-506-2111	Scientific Basis of Healthcare Science 1	6	1
ASHTS-506-2105	Applied Physics and Measurement 1	6	1
ASHTS-506-2106	Applied Physics and Measurement 2	6	1
ASHTS-506-2107	Applied Anatomy ,Physiology and Pathophysiology 1	6	1
ASHTS-506-2108	Applied Anatomy ,Physiology and Pathophysiology 2	6	1
ASHTS-506-2109	Clinical Measurement and Treatment 1	6	1
ASHTS-506-2110	Clinical Measurement and Treatment 2	6	1
ASPRJ-506-2008	Research Methods within a Research Project 1	6	1
ASWBL-506-2011	Work Based Training in Health Science 1	6	1
CDKSK-503-1907	English 1	3	1
CDKSK-503-1905	Critical Thinking 1	3	1
ASHTS-506-2112	Scientific Basis of Healthcare Science 2	6	2
ASHTS-506-2101	Physical Sciences 1	6	2
ASHTS-506-2102	Physical Sciences 2	6	2
ASHTS-506-2000	Professional Practice 1	6	2
ASHTS-506-2103	Applied Physiological measurement and Instrumentation 1	6	2
ASHTS-506-2104	Applied Physiological measurement and Instrumentation 2	6	2
ASPRJ-506-2009	Research Methods within a Research Project 2	6	2
ASWBL-506-2012	Work Based Training in Health Science 2	6	2
CDKSK-503-1908	English 2	3	2
CDKSK-503-1906	Critical Thinking 2	3	2
CDKSK-604-1909	Entrepreneurship	4	2
CDKSK-602-2105	Community Social Responsibility	2	2
ASHTS-606-2001	Professional Practice 2	6	3
ASPYM-606-1701	Biophysics	6	3
ASPYM-606-1703	Clinical Practicum	6	3
CSHSC-606-1521	Ethical Issues in Decision Making	6	3
ASPHY-606-1702	<i>Anatomy and Physiology of the Audio-Vestibular System*</i>	6	3
ASPYM-606-1704	<i>Diagnostic Testing in Audiology*</i>	6	3
ASAUD-606-1701	<i>Fundamentals of Amplification, auditory implantation and aural rehabilitation*</i>	6	3
ASAUD-606-1702	<i>Introduction to Vestibular Disorders*</i>	6	3
ASPSY-606-1701	<i>Psychosocial Aspects of Health Care**</i>	6	3
ASPYM-606-1706	<i>Respiratory Investigations-Basic Interpretation and Test Modalities**</i>	6	3
ASPYM-606-1702	<i>Cardiology Investigations-Basic Interpretation and Test Modalities**</i>	6	3

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ASPYM-606-1705	Neurophysiological Investigations-Basic Interpretation and Test Modalities**	6	3
ASDIS-612-1601	Dissertation	12	3
Total ECVET/ECTS		180	/

ASHTS-506-2111 Scientific Basis for Healthcare Science

1

Unit level (MQF): 5

Credits: 6

Unit Description

This program introduces the learner to the healthcare science profession, combined with a sound grounding in the basic science underpinnings of modern disease diagnostics, evaluation and treatment.

Modules will be mainly theoretical allowing in-depth knowledge that can be used in a health care setting to make informed decisions about patient care and treatment.

The unit content will include basic concepts of health, wellness and preventive care. Moreover, an in depth insight will be given into biochemistry, immunology and genetics.

By the end of the program the learner will be expected to be trained in health care professional protocol and be familiar with the ethical and legal responsibilities of today's healthcare provider. They should also be able to understand and use the basics of health protection medical terminology, and have basic life support skills. Research tools including data collection, critical analysis formation and awareness towards new developments in the field of healthcare will also be developed. This will provide the learner with the initial exposure to facilitate their application of knowledge within a healthcare setting.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Recognise the scientific basis behind health science.*
2. *Analyse cellular organelles together with the anatomical structure and functioning of different body system.*
3. *Identify the basic principles of biochemistry and molecular biology.*
4. *Outline basic immunology concepts.*
5. *Evaluate genetic principles and the process of life continuity and variation through genetics.*

ASHTS-506-2112 Scientific Basis for Healthcare Science

2

Unit level (MQF): 5

Credits: 6

Unit Description

This module will continue to provide a basic, yet broad foundation in the sciences that underpin the practice of Healthcare Sciences.

The learner will undergo further learning development and understanding of pharmacology, concepts associated with infection control and microbiology, Public health medicine, epidemiology and disease control, which will be covered together with the exposure of the latest technology, screening methods and treatment in the field. This will facilitate further their application of knowledge within a healthcare setting.

Overall, the unit will therefore act as a foundation for learners wishing to pursue a career as healthcare science practitioners, by providing the initial exposure to the necessary skills, attitude and knowledge.

Learning Outcomes

On completion of this unit the student will be able to:

1. Evaluate the effectiveness and appropriateness of screening.
2. Assess procedures for disease detection and treatment.
3. Understand concepts relating to pharmacology.
4. Recognise concepts relating to microbiology.

ASHTS-506-2105 Applied Physics and Measurement 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit introduces the learner to the applied physics applications that a healthcare science professional will encounter in various clinical practices. Although theoretical concepts are introduced to provide in-depth knowledge, the focus of the unit is practical applications in the health sector. Useful statistical techniques are introduced to the learner at the start of the unit (learning outcome one) as a way of showing how scientific data is displayed and interpreted. More advanced statistical testing is introduced later as used in various health science scenarios.

The unit continues by applying the three forms of energy: sound, light & heat to clinical practice. First the physics of each type of wave energy will be revised and then applications in health will be studied mainly: ultrasound in health, laser, gamma camera & endoscopy; and thermography.

The emphasis is on self-learning and research. This will encourage learners to use their own researched material and to actively participate in critical discussions about material covered.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Use statistics to solve health science problems.*
- 2. Recognise applications of sound in clinical practices.*
- 3. Explain how light is used in clinical practices.*
- 4. Evaluate how thermal energy is used in clinical practice.*

ASHTS-506-2106 Applied Physics and Measurement 2

Unit level (MQF): 5

Credits: 6

Unit Description

This unit introduces the learner to the applied physics applications that a healthcare science profession will encounter in various clinical practices. Although theoretical concepts are introduced to provide in-depth knowledge, the focus of the unit is practical applications in the health sector.

The unit starts by a study of the mechanics of the body and the physics of fluid flow with applications to blood flow. The unit continues by a revision of current electricity as a basis for the principles of bioelectricity on which the ECG and EEG tests are based. The principles of the latter two tests will be reviewed and these will be studied in more depth in the other unit: Applied Physiological Measurement & Instrumentation I. Then the physics of magnetism will be revised to serve as a foundation for magnetic resonance imaging technique. The unit will conclude by a study of the topic of radioactivity and its uses in the health sector.

The emphasis is on student self-learning and research by encouraging the learners to use their own researched material and to actively participate in critical discussions about material covered.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Evaluate how mechanics is used to understand the human body and fluid flow.*
2. *Assess how electricity is used to monitor electrical activity in patients.*
3. *Understand how magnetism is used in clinical practices.*
4. *Analyse how radioactivity is used to treat patients in clinical practices.*

ASHTS-506-2101 Physical Sciences 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit provides a wide foundation in physical sciences with an emphasis on health care applications. There are four learning outcomes giving learners a reasonable overview of concepts in physics and some basic chemistry. Explanations should be kept at an advanced to university level basis but no particular emphasis should be made on the mathematical description of physical nature, rather focusing on the descriptive and scientific nature. Where possible however, a mathematical understanding should be shown and described.

The first learning outcome focuses on the most fundamental topic of not only physics but science as a whole. The learners should be given clear insight into the branches and laws of physics, uses of physics in everyday life, and the importance of studying physics. Such a topic should also lay the ground work for the fundamentals i.e. units of measure, how practical work should be conducted, scientific writing, uses of software etc.

In the second learning outcome the learner will study vibrations and waves. This will include the fundamentals of natural and forced vibrations and lead on to resonance. Waves are studied generically at first before specializing in sound waves and a study of the human ear. The unit concludes with a description of ultrasonography.

The third learning outcome will compliment the previous learning outcome and expand further to study optics and vision. Concepts such as colour, spectroscopy and even the quantum nature of light will be discussed to balance the wave treatment. This will pave the way for treatment of lasers. Mirrors and lenses are discussed and simple optical instrumentation such as microscopes and telescopes will be studied. Optical fibres and endoscopy are studied. A basic treatment of vision, including eye defects concludes the unit.

Finally, the fourth learning outcome will tackle general physics of matter from the atomic physics perspective. Material physics will be discussed as well as a study of density and the three states leads on to the atomic theory and a brief introduction to the periodic table including the important groups of elements such as alkali metals, the halogens and noble gases. This can lead on to a basic understanding of atomic structure and bonding, including ionic and covalent bonding. The learner moves on to study fluids at rest and in motion. The learner initially studies pressure in a liquid at rest and then advances to fluids in motion. The learner also studies gas laws leading to the absolute temperature scale and Kelvin temperatures.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Recognise the fundamentals of physics, materials and their structure.*
2. *Apply fundamentals of vibrations and waves to acoustic and electromagnetic technologies.*
3. *Apply principles of optics to spectroscopy, imaging systems and vision.*
4. *Explain the properties of matter using atomic theory.*

ASHTS-506-2102 Physical Sciences 2

Unit level (MQF): 5

Credits: 6

Unit Description

This unit provides a wide foundation in physical sciences with an emphasis on health care applications. There are four learning outcomes giving learners a reasonable overview of concepts in physics and some basic chemistry. Explanations should be kept at an advanced to university level basis but no particular emphasis should be made on the mathematical description of physical nature, rather focusing on the descriptive and scientific nature. Where possible however a mathematical understanding should be shown and described.

In learning outcome one, the learner should be given a classical approach to physics and learn about mechanics. Mechanics may be applied to real life scenarios and its uses should further explain features of the body. For example, lever systems should explain how the body's musculo-skeletal structure works. The nature of impulse should also be impressed upon the learner and hence the learner can also deduce what happens in accidents etc.

Learning outcome two and three should be presented as a whole whereby the learner is not exposed to learning about how electricity works and its uses. Basic knowledge of circuitry should be provided to ascertain that the learner could understand how basic electrical items work. Electromagnetic induction will then reinforce this knowledge and assist the learner into learning more about the nature fields and how they influence medicine.

In the final learning outcome, the learner will complete the course by studying ionising radiations and medical technologies based on these. The structure of the atom and nucleus will be reviewed and the concept of nuclear instability introduced. This leads on to a discussion of the three main types of radiations alpha, beta and gamma as well as an understanding of how X Rays are produced. Properties of these radiations will be studied as well and applied to radiation safety, diagnostic imaging and therapies.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Use the fundamentals of mechanics to solve problems.*
2. *Recognise concepts of fields to magnetism, electricity and electromagnetic induction.*
3. *Apply concepts of electromagnetism to medical scenarios.*
4. *Use concepts of atomic and nuclear physics to describe ionizing radiations and therapies.*

ASHTS-506-2107 Applied Anatomy, Physiology and Pathophysiology 1

Unit level (MQF): 5

Credits: 6

Unit Description

This course aims to provide the basic underpinning knowledge in behavioural and human biological sciences to support learning in other modules. An introduction will be provided into the basic anatomy of body systems, the physiological functioning of basic units and systems, and on the disease process and treatment of these systems.

The outcome of this course is understanding of the structure and relationship between body parts, the function of these body parts and the body as a whole, and the malfunctions and diseases affecting these systems. The complexities of the cells, tissues, major organs and systems of the human body will be covered in areas related to neural & hormonal homeostatic control mechanisms, as well as the circulatory, respiratory, and endocrine organ systems. Further the pathophysiological disruptions usually related with these systems will also be covered.

Comprehensive and up-to-date information will be provided allowing for advanced human biology knowledge, giving learners the opportunity to apply this understanding to related fields as well as for aiding in diagnostic assessment and treatment. Ongoing critical evaluation and analysis of relevant scientific literature from differing sources will also help develop the necessary research skills often used in health sciences areas.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Describe the foundation of cell physiology and function.*
2. *Recognise the concept of homeostasis.*
3. *Analyse the Anatomy and Physiological functioning and Pathophysiology of the Cardiovascular and Respiratory systems.*
4. *Evaluate the Anatomy and Physiological functioning and Pathophysiology of the Nervous and Endocrine systems.*

ASHTS-506-2108 Applied Anatomy, Physiology and Pathophysiology 2

Unit level (MQF): 5

Credits: 6

Unit Description

This course aims to provide the basic underpinning knowledge in behavioural and human biological sciences to support learning in other modules. An introduction will be provided into the basic anatomy of body systems, the physiological functioning of basic units and systems, and on the disease process and treatment of these systems.

The outcome of this course is understanding of the structure and relationship between body parts, the function of these body parts and the body as a whole, and the malfunctions and diseases affecting these systems. The complexities of the cells, tissues, major organs and systems of the human body will be covered in areas related to urinary and gastrointestinal systems, musculoskeletal and reproductive systems, plasma membrane and membrane potential, blood and the immune system. Further the pathophysiological disruptions usually related with these systems will also be covered. An introduction to human fertilization and early embryological processes are also discussed.

Comprehensive and up-to-date information will be provided allowing for advanced human biology knowledge, giving learners the opportunity to apply this understanding to related fields as well as for aiding in diagnostic assessment and treatment. Ongoing critical evaluation and analysis of relevant scientific literature from differing sources will also help develop the necessary research skills often used in health sciences areas.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Describe the transport systems in the cell, disease process, immune mechanisms, and particular treatments in the body.*
2. *Analyse the Anatomy and Physiological functioning and Pathophysiology of the Musculoskeletal and Reproductive systems.*
3. *Evaluate the Anatomy and Physiological functioning and Pathophysiology of the Gastrointestinal and Urinary systems.*
4. *Describe Fertilisation and early Embryology.*

ASHTS-506-2000 Professional Practice 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit aims to enhance the learner's understanding of the practice of 'care' and of how to assess and meet the needs of the individual. The unit will enable learners to develop the knowledge and practical skills needed to create SMART action plans, which can improve their personal competencies.

The unit will introduce the learners to follow reflective practice and to understand its role in personal and professional development. The learner will also gain the necessary knowledge and skills needed to enable them to create action plans that identify personal and professional development needs. In addition to using reflective practice and action plans, the learner will create a portfolio of evidence, enabling the validation of their learning and Continuing Professional Development (CPD).

To become a safe working practitioner, the learner must be able to effectively integrate knowledge, theory and practice in a variety of care settings, whilst developing and applying a range of vocational knowledge and skills. This unit is designed to prepare learners for this role by being exposed to the practice of experienced practitioners, and finally allowed to practice these skills in a directly supervised environment.

This requires a work placement experience which will be sourced by the lecturer and allocated to the learner accordingly. There should be a mandatory number of hours for placement, which will facilitate a general experience of the working environment, and allow the learner time to achieve all learning outcomes, and to produce a professional portfolio. The chosen placement should benefit both the learner and placement provider, and all learning outcomes and mandatory hours should be clearly set out and discussed before commencement.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Recognise the importance of reflection in Personal and Professional Development.*
- 2. Design individualised action plans that reflect identified learning needs and goals.*
- 3. Create a critical appraisal of personal competencies and the matching necessary skills, in relation to health sciences professional practices and careers.*
- 4. Produce a portfolio that validates Continuing Personal and Professional Development.*

ASHTS-606-2001 Professional Practice 2

Unit level (MQF): 6

Credits: 6

Unit Description

This unit builds on Professional Practice 1. It aims to equip the learner with an understanding of the legislation, policy and ethical aspects of the practice of 'care', including how to assess and meet the needs of the individual. The unit will also enable the learners to further develop the knowledge and practical skills underpinning safe and effective practice.

The unit will introduce learners to the key concepts and principles of healthcare ethics that are required in a practice setting, and to the role of these principles in their personal and professional development. The learner will also gain the necessary knowledge—of relevant European and national legislation and policies, and of the institution- or department-level standards/procedures relevant to the area of practice—needed to become a safe working practitioner. In addition, the learner will have an opportunity to build upon the portfolio developed during the 'Professional Practice 1' placement (or to build a new Portfolio, if needed), which will enable him/her to further validate their learning and continuing professional development.

To become a safe working practitioner, apart from developing such specialised understanding of the relevant legal, ethical and policy requirements, the learner must also be able to effectively integrate gained knowledge, theory and practice in a variety of care settings, and to continue developing (and applying) specialised vocational knowledge and skills. This unit is designed to prepare learners for this, by exposing them to the practice of qualified and experienced practitioners, and by enabling them to practice these skills in a directly supervised environment.

This requires a work placement experience which will be sourced by the lecturer and allocated to the learner accordingly. There should be a mandatory number of hours for placement which facilitates a general experience of the working environment and will allow the learner time to achieve all learning outcomes and produce their professional portfolio. The placement chosen should benefit both the learner and placement provider with all learning outcomes and mandatory hours clearly set out and discussed before commencement.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Apply the key concepts and principles of healthcare ethics in the practice setting.*
2. *Recognise the importance of relevant European and national legislation and policies, and how these are reflected in institution- or department-level standards/ procedures, relevant to the area of practice.*
3. *Ensure safe and effective practice in the delivery of care whilst meeting the needs of individual service users.*
4. *Produce a portfolio that validates Continuing Personal and Professional Development.*

ASHTS-506-2109 Clinical Measurement and Treatment

1

Unit level (MQF): 5

Credits: 6

Unit Description

This course is designed to provide integrated training in the area of Clinical Measurement and Treatment. Learners are taught to measure and image the physiological activity of the human body and to provide diagnostic information. Focus is on the instruments used for measurement and diagnosis, their characteristics, underlying functioning and application on patients.

The practical and theoretical coursework covers advanced concepts in physiological measurement instrumentation, including current state of the art technology and its application in the areas of cardiology and vascular measurements. Guided by in depth teaching of the physiology, anatomy and biochemistry of the body, learners will learn how to contribute to the effective diagnosis and treatment of patients following instrument based diagnostic measures in the above areas.

Upon completion of the unit learners should be able to outline the physical and safety principles of specific instruments. These will include ECG, Image Intensification, Ultrasound investigations and Doppler amongst others. Learners should also be able to properly read and interpret measurements from these instruments, and advise appropriate management of these instruments accordingly. Finally, learners should be able to apply this know how to aid in condition diagnosis and to inform treatment options in case study scenarios.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Recognise clinical measurement and treatment.*
2. *Identify common disorders or conditions and their available treatment or management in the areas related to the cardiovascular system.*
3. *Recognise the clinical measurements used in cardiology.*
4. *Apply clinical measurements used for vascular measurement.*

ASHTS-506-2110 Clinical Measurement and Treatment

2

Unit level (MQF): 5

Credits: 6

Unit Description

This course is designed to provide integrated training in the area of Clinical Measurement and Treatment. Learners are taught to measure and image the physiological activity of the human body and to provide diagnostic information. Focus is on the instruments used for measurement and diagnosis, their characteristics, underlying functioning and application on patients.

The practical and theoretical coursework covers advanced concepts in physiological measurement instrumentation, including current state of the art technology and its application in the areas of respiratory and neurophysiology. Guided by in depth teaching of the physiology, anatomy and biochemistry of the body, learners will learn how to contribute to the effective diagnosis and treatment of patients following instrument based diagnostic measures in the above areas.

Upon completion of the unit learners should be able to outline the physical and safety principles of specific instruments. These will include EEG, Image Intensification, Ultrasound investigations and Doppler, CT scan, MRI and X-Rays amongst others. Learners should also be able to properly read and interpret measurements from these instruments, and advise appropriate management of these instruments accordingly. Finally, learners should be able to apply this knowhow to aid in condition diagnosis and to inform treatment options in case study scenarios.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Evaluate common disorders or conditions and their available treatment or management in the areas related to respiration.*
- 2. Recognise clinical measurements used for pulmonary function.*
- 3. Evaluate common disorders or conditions and their available treatment or management in the areas related to neurophysiology.*
- 4. Recognise the clinical measurements used in neurophysiology.*

ASHTS-506-2103 Applied Physiological Measurement and Instrumentation 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit aims to provide the basic underpinning knowledge in the methods and physics behind physiological measurement and instrumentation used. This unit will provide all the basics applied in the measurement of human physiological parameters used in healthcare and is continued in Applied Physiological Measurement & Instrumentation II. It introduces the subject by considering biosignals from the whole body and their corresponding sensors. Then several topics will be studied in more detail including physiological pressure and body temperature. More related topics will be studied in the 2nd unit.

The outcome of this unit is understanding the physics behind several methodologies and applying them to measure physiological parameters. This will require basic knowledge on human physiology as supported and delivered in other modules. Physiological measurement will mainly focus on bio-sensors, transducers and other associated equipment used to measure and record signals deriving from various parts of the human body. These signals are generally linked with chemical, electrical or mechanical changes within the investigated part. Generalised models of medical instrumentation will be discussed and explored during delivery of this unit with a focus on each functional part of the instrument. Throughout the delivery of this unit, state-of the art technology will be used as a reference model for each instrument explored. A focus on how physiological signals mainly from the nervous, circulatory, muscular and respiratory systems may be recorded using physical parameter changes (electrical, chemical, pressure, flow, volume, etc.) will be done. This unit will also deal with how recorded signals can be further used in clinical investigation, diagnosis and disease/disorder management.

The emphasis is on self-learning and research by encouraging the learners to use their own researched material and to actively participate in critical discussions about material covered.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Understand physiological measurement.*
2. *Analyse how mechanical waves are detected by biomedical instruments, and how these instruments enable treatment.*

3. *Evaluate how physiological pressure is measured by biomedical instruments, and how these instruments enable treatment.*
4. *Recognise how temperature is measured using biomedical instruments, and how these instruments enable treatment.*

ASHTS-506-2104 Applied Physiological Measurement and Instrumentation 2

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is a continuation of Applied Physiological Measurement & Instrumentation I and should follow the latter unit. It should also follow the Unit 'Applied Physics & Measurement II' which includes a good foundation for current electricity - which is applied in some detail in this unit.

This unit will continue to provide the basic underpinning knowledge in the methods and physics behind physiological measurement and instrumentation used in health care.

The outcome of this unit is understanding the physics behind several methodologies and applying them to measure physiological parameters. This will require basic knowledge on human physiology and physics as supported and delivered in other modules including Applied Physics & Measurement I and II and Physical Science I and II.

This unit will cover the instrumentation measuring bioelectrical signals including a detail of ECG, EEG and EMG including the interpretation of the respective signals. This will be followed by the measurement of physiological respiratory gases as needed in Pulmonary functional tests and in anaesthesia. Another new topic dealt will be sleep studies and its treatment with an emphasis on instrumentation used and finally the unit will end by a review of diagnostic brain imaging technology.

Generalised models of medical instrumentation will be discussed and explored during delivery of this unit with a focus on each functional part of the instrument.

Throughout the delivery of this unit, state-of the art technology will be used as a reference model for each instrument explored. A focus on how physiological signals mainly from the nervous, circulatory, muscular and respiratory systems may be recorded using physical parameter changes (electrical, chemical, pressure, flow, volume, etc.) will be done. This unit will also deal with how recorded signals can be further used in clinical investigation, diagnosis and disease/disorder management.

The emphasis is on student self-learning and research by encouraging the learners to use their own researched material and to actively participate in critical discussions about material covered.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Describe how electrical potentials are detected by biomedical instruments, and how these instruments enable treatment.*
2. *Assess how physiological gas variables are measured using biomedical instruments, and how these instruments enable treatment.*
3. *Evaluate the instrumentation related with sleep investigation and the treatment of sleep disorders.*
4. *Analyse how brain structure and function is measured through imaging techniques and how these enable treatment.*

ASPRJ-506-2008 Research Methods within a Research Project 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit will cover aspects of research methods used in research. The aim is to introduce learners to research and develop their understanding and skills in both quantitative and qualitative research methods. Learners will be introduced to the research process and apply different methodologies, data collecting tools and conceptual frameworks. The end-point of the module is the submission of a Statement of Intent (Proposal) for a research project in-line with College Regulations. This unit is meant to be followed by Research Methods 2.

In this study-unit, learners will cover different types of research design including experimental, descriptive and observational designed. Qualitative data collection designs to be introduced include archival studies, interviews and case studies. The methodological applications of these methods, including the design of appropriate research questions, will also be covered.

The syllabus also covers the challenges of various data collection techniques as well as the measurement issues of questionnaire development, reliability and validity of data, issues of sampling and of sampling size.

Following completion of this unit, learners should be familiar with all parts of the research process including funding application, ethics and publication. Tools will be provided for the learner to individually formulate a research question and to write a sound research proposal.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Describe the main stages of the research process.*
- 2. Select the appropriate research design for a research question.*
- 3. Compile a suitable ethical protocol.*
- 4. Complete a research proposal for a specific research project.*

ASPRJ-506-2009 Research Methods within a Research Project 2

Unit level (MQF): 5

Credits: 6

Unit Description

This unit will cover further aspects of research methods used in research. The aim is to help the learners collect data, analyze it, and draw meaningful conclusions from it. The end-point of the module is the submission and presentation of a Level 5 research project in-line with College Regulations. The learners will be encouraged to complete a project as a pilot to a larger research endeavor such as a thesis. This unit is meant to be preceded by Research Methods 1.

The quantitative part of the unit will address research questions in terms of statistical concepts. Methods such as descriptive statistics, estimation and confidence intervals and inferential statistical tests such as chi-square, t-tests and ANOVAs for both parametric and non-parametric data will be covered. Skills in using statistical software such as SPSS will also be developed.

In this study-unit, learners will learn to organize and format a research report in line with College Regulations. This might include the preparation and presentation of a research poster. Techniques for presenting research during a viva or other similar scenarios will also be taught. Skills in compiling and writing a Literature Review will be covered. Preparation and proper formatting of Tables and Figures will also be taught.

Following completion of this unit, learners will have experienced the research process, and will be able to express their experiences and findings in a suitable format.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Use qualitative and/or quantitative methodologies.*
- 2. Apply research methods, including a correct sampling method, taking into consideration issues such as reliability, validity, and bias.*
- 3. Use the appropriate Software for processing and analyzing results.*
- 4. Compile a research report based on own research endeavors.*

ASWBL-506-2011 Work-based Training in Health Science 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is designed to bridge school education and the workplace, through supervised work placements in the health care setting. Learners will be given the opportunity to develop and hone employability skills whilst putting what they've learnt into practice.

The unit will train the learner to prepare and plan the work day, to organise information effectively and to take charge of one's own learning and progress. Group work skills will also improve as learners learn to work under supervision and work as a multidisciplinary health care team.

Learners will be able to develop interpersonal skills such as effective communication and listening tools. This experience will allow learners the opportunity to practice interacting with patients, carrying out standard medical procedures and using medical health care instruments. The placement will provide insight into the pressures of the health care work place, hopefully motivating the learner to take charge and come up with problem solving strategies. The portfolio that learners keep of this experience will permit them to reflect on their performance, evaluating their strengths and deficits and seeing which areas and skills need the most improvement. This exercise might also help determine the career path that learners take, perhaps influencing subject choices, career goals and focus.

The learners are deemed successful if they obtain a pass in the module and successfully attend the 120 hours work placement excluding absences not exceeding 12 hours and which are deemed justifiable by the Institute Management.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Recognise placement requisites.*
2. *Generate interpersonal and transferrable skills.*
3. *Evaluate the work experience.*
4. *Evaluate the qualities and skills required during a physiological measurement.*

ASWBL-506-2012 Work-based Training in Health Science 2

Unit level (MQF): 5

Credits: 6

Unit Description

This unit has been designed to continue to support the learner to develop further their employability skills whilst applying knowledge into practice. The unit will give the opportunity to continue with the work based training whilst the learner will take charge of one's own learning and progress.

The learner will continue to undergo further development in the management skills such as the interpersonal, conceptual and technical skills. This experience will allow learners the opportunity to demonstrate the ability to work within the dynamics of a multidisciplinary team and practice further on carrying out standard medical procedures and using medical health care instruments.

The portfolio that learners keep of this experience will permit them to continue to reflect further on their performance, evaluating their strengths and deficits and seeing which areas and skills need the most improvement. This exercise might also help determine the career path that learners take.

The learners are deemed successful if they obtain a pass in the module and successfully attend the 120 hours work placement excluding absences not exceeding 12 hours and which are deemed justifiable by the Institute Management.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Generate interpersonal and transferrable skills.*
- 2. Demonstrate the ability to work within the dynamics of a multidisciplinary team.*
- 3. Evaluate on the work experience and its influence on career choice.*
- 4. Recognise the application of physiological measurement.*

ASPYM-606-1701 Biophysics

Unit level (MQF): 6

Credits: 6

Unit Description

This unit covers the physics of the biological systems governing human physiology with respect to areas that are relevant to the final year of the BSc Physiological Measurement Course. The scope is to consolidate and fulfil the most relevant areas that may be encountered in the future jobs targeted by this course. It also serves as a foundation for other units in this course including *The Anatomy & Physiology of the Audio-vestibular System*, *Diagnosing testing in Audiology* and *Fundamentals of amplification, auditory implantation & rehabilitation*.

Four main themes will be studied i.e. the physics of electricity which will applied to nervous and muscular action including cardiac muscle action; the physics of pressure governing the cardiovascular and respiratory systems; the physics of sound with respect to the auditory system and the physics behind important devices or tools or procedures used in this job.

The emphasis is on student self-learning and research by encouraging the students to use their own researched material and to actively participate in critical discussions about material covered.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Understand the basics electrical principles relevant to the health sector & the electrical activity of nerves & muscles.*
2. *Correlate the physics of pressure with the normal functioning of the cardiovascular and respiratory systems.*
3. *Examine the physics of sound underlying the human auditory system.*
4. *Evaluate the function and effectiveness of some common technological devices and/or procedures used in the cardiac and audiology hospital departments.*

ASPYM-606-1703 Clinical Practicum

Unit level (MQF): 6

Credits: 6

Unit Description

This module will provide the learner with didactic and experiential learning in the area of physiological measurements, including the application of the care process and model to simple and complex medical conditions. Learners will complete a minimum of 60 hours of theoretical and/or experiential learning. In this manner, the learner will have gained an understanding of the role of the physiological measurements practitioner in a multi-disciplinary healthcare team.

By the end of the course, learners will have to present their experiential learning in the form of a log book as indicated in the module lead.

The unit will therefore assist the learners in developing knowledge and skills that are needed to provide assessment with a variety of disorders across the life span. It will also assist to develop the relevant communication skills needed, as well as further developing professional writing skills.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Perform and observe a wide range of investigation techniques.*
2. *Present information effectively to communicate ideas clearly.*
3. *Carry out scientific research related to evidence-based practice.*
4. *Appraise and synthesise information to gain new insights into aspects of current practice.*

CSHSC-606-1521 Ethical Issues in Decision Making

Unit level (MQF): 6

Credits: 6

Unit Description

The course is designed to provide an overall insight into concepts of ethical issues and decision making. It targets the interface of decision making and ethics, showing the consideration that must be brought to bear for decision to be an ethical one. It merges the knowledge of philosophy of ethics with the management of science of decision making and applies the result to daily decision problems in Health and Social Care. In order to be able to target this interface and to merge the philosophy of ethics with the science of decision making the course needs to cover both topics separately.

This is why the course will firstly start with an introduction of theory-based knowledge in order to provide students with basic understanding of what ethics is in everyday and professional life. The participants will also get introduced with ethical principles and types of ethics which will be explored in order to get understanding of the divine and natural law ethics, utilitarian and deontological ethics. The course will continue in explaining moral rules such as veracity, privacy, fidelity and confidentiality, and moral principles such as respect for autonomy, non-maleficence, beneficence and justice.

The ethical guidelines and professional codes of different Health and Social Care Professions shall be investigated with a particular focus on the ethical guidelines available for Health and Social Workers. Bioethics, or as it is sometimes called medical ethics will be covered more deeply through the mentioned rules, principles and guidelines, since in addition to the above mentioned this module is aimed to explore complex ethical issues and problems. Some of these include: genetic diagnostic testing, cloning and stem cell research, gene therapy and nanotechnology, patenting with respect to GMO's products, pharmaceuticals and genetic resources, beginning as well as end of life issues, issues of aging, organ transplant and ICT implants.

The students will also have the opportunity to explore the principle of double effect such as uterine cancer and ectopic pregnancy, ordinary/extraordinary treatments, fundamental human rights, absolute versus non-absolute rights, personhood versus being and the status of the human embryo.

Afterwards the first section, participants will get acquainted with different types of decisions we all make every day and will have to consider different models of decision making. The distinction between decision making and problem solving will be tackled and the process of systematic approach to methods of reaching a decision will be introduced. As well the participants will be able to learn the decision making techniques.

Finally, an evaluation of how making choices and decision can have impact on ethical issues shall be appraised. The way in which ethical issues influence decision-making strategies shall also be considered. Legal aspects and legislation related to data protection, anti-discriminatory practice, protection of vulnerable people, professional liability and indemnity shall be covered.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Demonstrate a general understanding of ethics and ethical principles.*
2. *Apply practical knowledge in decision making process.*
3. *Examine, investigate and make choices about various ethical problems.*
4. *Critically discuss various ethical issues.*

ASPHY-606-1702 Anatomy and Physiology of the Audio-Vestibular System

Unit level (MQF): 6

Credits: 6

Unit Description

This unit aims at providing an understanding of the anatomy and physiology of the audio-vestibular system. This unit will introduce the anatomy and function of the main parts of the audio-vestibular system. Students will also be exposed to the main cellular and neurophysiological mechanisms which are involved in the hearing system. Students will be introduced to the main mechanisms of hearing loss.

The outcome of this unit is the understanding of the anatomy and physiology of the main parts of the hearing system including: the outer ear, the middle ear, the cochlea, the auditory nerve, auditory brainstem, and the auditory cortex. This unit will also focus on the auditory pathway and the physiology behind structural hearing loss. Throughout the teaching of this unit, students will be kept in close contact with latest scientific findings. Continuing evaluation of current scientific findings will allow students to develop further knowledge in the anatomy and physiology of the audio-vestibular system, and assist their development as scientific researchers.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Evaluate the basic aspects and cellular functions involved in hearing and development of the audio-vestibular system.*
- 2. Understand the Anatomy and Physiology of the basic components of the audio-vestibular system.*
- 3. Explain the mechanism involved in the development of the main structures of the audio-vestibular system.*
- 4. Outline the anatomical and physiological changes involved in structural damage of the audio-vestibular system, resulting in temporary or permanent hearing loss.*

ASPYM-606-1704 Diagnostic Testing in Audiology

Unit level (MQF): 6

Credits: 6

Unit Description

This unit aims at providing basic knowledge of diagnostic testing in audiology. Through this unit, students will be introduced to the common causes of hearing loss, the basic aspects of clinical examination, the requirements for diagnostic testing and interpretation of results acquired from audio logical testing. Students will also be trained in structuring an effective audio logical appointment and in effective case history taking.

The outcome of this unit is the understanding of the main concepts of diagnostic tests carried out in the field of audiology. Following this unit, students should be able to: identify the common causes of hearing loss in both adult and paediatric patients, select and administer appropriate audio logical assessments and adequately interpret these test results.

Throughout the teaching of this unit, students will be kept in close contact with latest scientific findings and speculations. Students will also be given the opportunity to apply their knowledge through the presentation of clinical case studies with various audio logical test results which they will be asked to interpret. Continuing evaluation of current scientific literature will allow students to develop further knowledge in diagnostic audiology, and assist their development as scientific researchers.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Define hearing loss in terms of: cause, type, severity, and site of impairment.*
2. *Carry out a first appointment (initial interview, case history taking, clinical examination) and use outcomes to structure the Audiology Appointment.*
3. *Master the administration of diagnostic audio logical tests, interpret test results, and effectively communicate outcomes.*
4. *Understand the necessity of audio logical testing in the paediatric age group and administer required diagnostic audio logical tests.*

ASAUD-606-1701 Fundamentals of Amplification, Auditory Implantation, and Aural Rehabilitation

Unit level (MQF): 6

Credits: 6

Unit Description

This module aims at introducing the technology options available in the rehabilitation of individuals with hearing difficulties. Through this module, students will be introduced to the various amplification opportunities which are available for individuals with hearing difficulties. Students will also be exposed to methods which enable successful rehabilitative amplification. Students will be trained in identifying the adequate option for patients with hearing difficulties.

The outcome of this module is to introduce the various technologies used in the treatment of hearing loss including hearing aids and implantable devices. Following this module, students should be able to identify ideal technology for assisting individuals with hearing difficulties, whilst also establishing a framework of rehabilitation which tackles the hearing impaired individual's clinical needs in a holistic manner.

During this module, students will be kept in close contact with the latest technological advances in treating hearing difficulties, and scientific findings. Students will also be given the opportunity to apply their knowledge through the presentation of clinical case studies. Continuing evaluation of current scientific literature will allow students to develop further knowledge in amplification and rehabilitative audiology, and assist their development as scientific researchers.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Understand the various treatment options for individuals with hearing loss, including; hearing instruments, implantable devices, aural rehabilitation techniques and Assistive Listening Devices (ALDs).*
2. *Understand the selection criteria, verification and validation procedures involved in the amplification/implantation route.*
3. *Describe a framework of aural rehabilitation which holistically treats hearing impaired individuals and their communication partners.*
4. *Create awareness on counselling tools which enhance perception and deal with emotional impacts of hearing impairment.*

ASAUD-606-1702 Introduction to Vestibular Disorders

Unit level (MQF): 6

Credits: 6

Unit Description

This unit will provide students with a general understanding of the vestibular system, system dysfunction and the options available to a clinician with regards to functional measurement and treatment. There are four learning outcomes, encompassing the whole spectrum required for working in this field of study. The first two outcomes deal with how the system functions (normally and abnormally) and the different conditions that may be encountered. Later on, students will be taken through vestibular functional measurement and treatment options.

In outcome one, students will be introduced to the anatomy of the human balance system. This shall section shall initially discuss the balance system in general, however emphasis will then be placed on the peripheral vestibular sensory system, which is of interest to the Audiology stream. Physiology shall be emphasised so that students will be able to explain the function of each part of the anatomy.

In outcome two, abnormal function shall be examined in detail. This will be linked to anatomy, so that students can explain what is happening during dysfunction. This will be discussed in terms of the most common vestibular disorders. Students shall be expected to define these disorders and also explain their main characteristics.

In outcome three, bedside and laboratory vestibular tests shall be identified and discussed in detail. Each test shall be discussed in terms of what it measures and how it measures it. Students will then be taught how to choose which test to use when faced with a patient. At the end of the course, students will be expected to know how to choose a battery of tests for a vestibular patient.

In outcome four, possible treatment options for the treatment of vestibular patients shall be examined. Although students will not be expected to skilfully administer treatment themselves, they will be expected to evaluate potential treatment options for particular vestibular disorders.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Identify and describe the different components in the human balance system, explaining their role and function.*
2. *Define the most common vestibular disorders and explain their main characteristics.*

3. *Develop a battery of tests based on patient symptoms using bedside and laboratory vestibular tests.*
4. *Evaluate different treatment options available for vestibular patients.*

ASPSY-606-1701 Psychosocial Aspects of Health Care

Unit level (MQF): 6

Credits: 6

Unit Description

This unit introduces students to the psychosocial aspect of health and well-being. Understanding health as more than biological wellness has been a challenge in the medical community. However, there is now increasing recognition of health as a result of the interaction of biological, psychological and social influences. For this reason, a holistic approach including the biopsychosocial aspect of health and well-being will be adopted throughout the unit. Different psychological approaches and relevant aspects within Health Psychology will be explored.

The Unit focuses on different definitions of health and on understanding the patient in a holistic way. The focus is on how the biological, psychological and social aspects interact to influence a person's health and well-being. A deeper analysis of the psychological influences on health will then be carried out, with focus on mental health conditions, particularly those where physical and psychological symptoms interact to affect the patient's health and well-being. Possible explanations for these effects will be examined using the Psychodynamic, Biological, Cognitive and Social perspectives within psychology. An outline of available treatments will be provided. Psychological factors affecting the course of the disease and the effectiveness of treatment will also be discussed.

The last part of the Unit will focus on patient centred care and on the importance of holistic health care delivery. The best ways of supporting patients while considering their psychosocial well-being will be discussed. These include communication skills and values relevant to health settings. A Humanistic perspective will be adopted in examining how patients can best be supported. The issues of referral and burnout in relation to the health care provider will also be discussed.

Learning Outcomes

On completion of this unit the student will be able to:

1. *Adopt a holistic approach when examining a patient's health based on the biopsychosocial perspective.*
2. *Explain psychological influences on health, including mental health.*
3. *Analyse how psychological factors affect the course of disease and the effects of treatment.*
4. *Explain how patients' psychosocial well-being should be supported.*

ASPYM-606-1706 Respiratory Investigations-Basic Interpretation & Test Modalities

Unit level (MQF): 6

Credits: 6

Unit Description

This unit covers the diversity of tests used for diagnosing the most common disorders of the respiratory system. It serves as a consolidating study of the respiratory system in which the students finally integrate the knowledge they have gathered from other units throughout their course and to prepare them fully for their future jobs in the health care sector.

The first theme includes a detailed revision of the anatomy and physiology of the respiratory system together with a classification of the main pathologies. The next three themes include the various respiratory investigations and test modalities including spirometry, blood gas measurements and other related tests.

The emphasis is on student self-learning and research by encouraging the students to use their own researched material and to participate and build the lessons through PowerPoint presentations and discussions.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Establish a detailed relationship between the structure and function of the respiratory system including the identification of the common related pathologies.*
- 2. Evaluate the use of spirometry testing in respiratory investigations.*
- 3. Examine the relationship between blood gas measurements and respiratory function both normal and abnormal.*
- 4. Appraise the need for other Lung Function tests for the proper diagnosis of respiratory disorders.*

ASPYM-606-1702 Cardiology Investigations-Basic Interpretation & Test Modalities

Unit level (MQF): 6

Credits: 6

Unit Description

This unit builds on the skills and knowledge acquired in previous units covering cardiac anatomy and physiology as well as in the spectrum of cardiology investigations and instrumentation. Students will explore the principles and practice of a range of non-invasive and invasive cardiac investigations.

The outcome of this unit is the understanding of the principles of a range of physiological measurements cardiac investigations, to critically analyse the acquired data and construct provisional diagnosis related to the Pathophysiology related to Chronic Ischemic Heart Disease; Acute coronary syndromes; congenital heart disease and structural heart disease and Cardiac arrhythmias which is to be presented constructively to Senior officers and Cardiologists.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Understand the objectives for various diagnostic and investigational physiological measurement procedures.*
- 2. Describe the methodology of acquiring diagnostic and investigational data. Instrumentation process and calibration techniques for basic physiological measurement procedures.*
- 3. Process and critically analyse the acquired data to attain a differential diagnosis.*
- 4. Understand the process of procedures and investigations and the different roles of the team members.*

ASPYM-606-1705 Neurophysiological Investigations- Basic Interpretation & Test Modalities

Unit level (MQF): 6

Credits: 6

Unit Description

This unit aims to provide a basic knowledge in human neurology and neurophysiology allowing one to grasp a basic understanding of the subject matter and to use it as a base for learning other medical subjects.

An introduction will be provided into the neurophysiological functioning of basic body units and systems, and on applied neurology/pathology of these systems.

The outcome of this course is to lead one to understanding the function of human neurology and its application as a whole, and some pathologies affecting these systems. The complexities of the cells, tissues, major organs and systems comprising human neurology will be covered in areas related to physiology, anatomy and pathology of the respective systems and disorders. The focus will comprise clinical neurology, electroencephalography, evoked potential studies and electromyography.

Comprehensive and up-to-date information will be provided allowing for advanced human neurophysiology and neuropathology knowledge, giving students the opportunity to apply this understanding to other related fields as well as for aiding in diagnostic assessment and treatment.

Learning Outcomes

On completion of this unit the student will be able to:

- 1. Describe the foundation of neurological examination and some main pathologies seen in clinical neurology.*
- 2. Identify normal patterns and pathological use and interpretation of electroencephalography.*
- 3. Understand the uses of evoked potential studies.*
- 4. Identify normal patterns and pathological use and applications of electromyography.*