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**DEPARTMENT OF HEALTH**

**DIPLOMA OF GENERAL NURSING**

**ANATOMY & PHYSIOLOGY**

**NUR 114**

**TEACHING & LEARNING RESOURCES**

# SUBJECT GUIDE

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| --- | --- |
| SUBJECT NAME: | Anatomy & Physiology |
| SUBJECT CODE: | NUR 114 |
| TOTAL CREDIT POINTS: | 12 |
| PNGQF: | 5 |
| PREREQUISITES: | Nil |
| COREQUISITES: | Nil |

## SUBJECT AIM

To provide students with an introduction and basic understanding about the structure and function of the body. The subject also provides students with the opportunity to explore a variety of microorganisms responsible for causing different diseases.

## SUBJECT DESCRIPTION

This unit introduces students to the basic anatomy and physiology of the human body, levels of organisation and homeostasis, and the impact of functional disorder. As this knowledge underpins the development of professional nursing practice this unit aims to motivate students to observe patients in the clinical setting who are physiologically normal and those that are experiencing functional disorder resulting in changes to cells, tissues, organs and body systems. This unit will enable students to develop a practical understanding of the microbial world, the interaction between microbes and host, and the complex workings of the body’s defence mechanisms.

## SUBJECT DELIVERY

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Total hrs per week** | **No. of weeks** | **Lectures** | **Tutorials/ Clinical** | **Self- Directed Learning** |
| **9** | **15** | **4** | **3** | **2** |

## LEARNING OUTCOMES

Upon completion of this subject the student will be able to:

|  |  |  |
| --- | --- | --- |
| Subject Learning Outcomes | Focus Competency Units and Elements | Focus Course Learning Outcomes |
| 1. Explain the major body systems and levels of organisation in the human body;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 2. Explain the concept of physiological control systems as this relates to homeostasis;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 3. Describe the cell and its division;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 4. Describe the function of different tissues and glands;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 5. Describe the anatomy, physiology and function of the cardiovascular, integumentary, sensory and respiratory systems;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 6. Demonstrate understanding of the principles of microbiology, the microbial world and the interaction between microbes and host;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 7. Apply knowledge of microbiology and the principles of infection control;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 8. Explain immunity and the defence mechanism;  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |
| 9. Apply concepts raised in this unit to nursing practice at a beginning level.  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1,2,3,4,7  |

## TOPIC OUTLINE

### Topic 1 (1 week)

INTRODUCTION TO ANATOMY & PHYSIOLOGY, levels of organisation.

**Topic 2 (1 week)**

BRIEF OVERVIEW OF CELL, transport, osmosis and homeostasis, scientific notation, scientific terminology.

**Topic 3 (1 week)**

ATOMS AND MOLECULES, elements, radioactivity. Compounds, ionic and covalent bonds, metabolism and enzymes, mixtures and solutions. States of matter, fluids and electrolytes, acids and bases, pH buffers and their importance in the body. Pressures and forces, osmosis, diffusion. Electricity, electrical devices in hospitals. Heat and body temperature.

**Topic 4: (1 week)**

STRUCTURE AND FUNCTIONS OF THE CELL, cell division mitosis and meiosis, tissues their classification and function.

**Topic 5: (1 week)**

Types of glands and their function. Types of membranes and their functions. Tumours of glands and membranes.

**Topic 6: (1 week)**

INTEGUMENTARY SYSTEM. Structure and function of the skin. Pathophysiology of the skin.

**Topic 7: (1 week)**

SENSORY SYSTEM. Structure, function and disorders of the eye.

Structure, functions and disorders of the ear. Structure and functions of the other sensory systems. Waves: hearing and ultrasound, sight and electromagnetic radiation.

**Topic 8: (2 weeks)**

CARDIOVASCULAR SYSTEM. Structure and function of the cardiovascular system.

**Topic 9: (2 weeks)**

RESPIRATORY SYSTEM. Structure and function of the respiratory system. Respiration and gas exchange in the body and factors that affect the normal function.

**Topic 10: (2 weeks)**

MICROBIOLOGY. Historical background of microbiology. Micro-organisms and parasites. Types, classification, characteristics, growth and identification. Micro-organisms and the human body. Sources of micro-organisms. Normal flora and potential pathogenic micro-organisms. Transmission of micro-organisms. Bacteriostatic and antibiotics: action, sensitivity, resistance and hypersensitivity. Infection and immunity: the concept of immunity, active and passive immunity, defence mechanism. Methods of limiting spread of micro-organisms and controlling infection including sanitation, sterilisation, disinfection, asepsis. Use of specific nursing precautions or isolation procedures. Collection and transport of microbiological specimens.

**Topic 11:**

CONSOLIDATION, review, apply to nursing

## TEACHING GUIDE

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| --- | --- | --- | --- | --- |
| **Week** | **Topic & objectives** | **Topic** | **Directed learning activities** | **Self-directed learning** |
| 1 | **Topic One - Introduction to Anatomy and Physiology** *On completion of this topic students will be able to:*Describe anatomy and physiology and the essential functions for maintaining life | Introduction to anatomy and physiologyWhat is anatomy and physiology | *Lecture:* Introduction to Anatomy and Physiology*Discussion:* student’s own understanding of human functioning.*Tutorial:* Essential functions for maintaining lifeReview of subject expectations, student responsibilities for their own learning. Expected study hours needed to succeed in the subject. | **Post lecture activity**Make sure you understand the expectations of the subject. List questions you have to bring to the tutorialReview the subject outlineEnsure understanding of assessment tasks**Self-Directed Learning**Read Chapter 1 of your text book. Write down information that doesn’t make any sense to you. Then be prepared to discuss the questions in class.Answer the review questions. |
| 2 | **Medical terminology** | Brief overview of cell, transport, osmosis and homeostasis, scientific notation, scientific terminology | *Lecture:* Overview of terminology, what it means and how it assists nurses Medical Terminology and the language of anatomy.*Discussion:* Review terminology, practice writing and explaining using correct terminology.Label diagrams & discuss.Work in groups to name each cavity and quadrant – visual aids to assist.Review a clinical chart for medical terminology | **Pre-reading**Download the medical terminology resource book. **Post lecture activity**Identify 10 new words and practice using them in a sentence.**Self-Directed Learning**Read Section 1 of the textbook. Focus on 1.3 and 1.3.2. make sure you understand and could explain the levels of structural organisation in the human body and the different organ systems. Review Section 1.7 on terminology. Answer the questions in your workbook. |
| **Practice Quiz** | *This short quiz will consist of 10 questions related to the Topic of the first 2 weeks of the subject. This is a formative task. Students can either complete the quiz in class in week 3 or take it away after week 2 class and complete it in their own time. The answers and explanations need to be provided at the beginning of the activities in week 3*.  |
| 3 | **Basic applied science and chemistry as they affect body structure and function** | Atoms and molecules, elements, radioactivity. Compounds, ionic and covalent bonds, metabolism and enzymes, mixtures and solutions. States of matter, fluids and electrolytes, acids and bases, pH buffers and their importance in the body.  | *Lecture:* Introduction to the chemistry of life. Biochemistry, importance of biological molecules, how fluids and electrolytes work in the human body. How fluids move. Pressures and forces, osmosis, diffusion. *Lecture:* Heat & body temperature-temperature regulation.*Discussion:* Using laboratory results from patient histories students will review the results, examine what they show, what this tells them and explain why this is important information for nurses. | **Pre-reading** Begin to read Chapter 2 of your text book, note any new terms and bring questions to your lecture.**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined.**Self-Directed Learning**Finish reading chapter 2 and answer the review questions. Discuss points you don’t understand in class.The critical thinking questions will be discussed in class. |
| 4 | **Cells and Tissues** | How is the body organisedStructural organisational levelsCells and tissuesCell specialisation | *Lecture:* Structure & functions of cells. Cellular organisation, cell division, mitosis and meiosis, tissues and their classification.*Activity/discussion*: Jigsaw reading. Divide students in groups of 6 to explain to their peers from the list of human cells provided by the facilitator, differences in cell structure. This is to be discussed briefly and it will be covered in detail under each system. Students to present to each group until all groups are covered.Students to do reading to ensure they understand  | **Pre-reading**Begin to read Chapter 2 of your text book, note any new terms and bring questions to your lecture.**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined.**Self-Directed Learning**Finish reading chapter 2 and answer the review questions. Discuss points you don’t understand in class.The critical thinking questions will be discussed in class |
| 5 | **Cells, Tissues and Glands** | Essential functions for maintaining lifePlasma membraneTissuesFluid environmentBulk transportHomeostasis | *Lecture:* the role of homeostasis in health functioning, fluid transport, fluid and body compartments, water balance, electrolyte balanceTypes of glands and their function. *Discussion:* Water Balance and ECF osmolalitySources of body waterRoutes of gain and loses of water, Regulation of water intakeRegulation of water outputInfluence of ADHStudents work in groups to create a concept map which illustrates how fluids move in the body. Each group to provide a short explanation about the importance of homeostasis. | **Pre-reading**Read Chapter 26, sections 26.1, 26.3, 26.3 and revise the section on homeostasis in Chapter 1**Post lecture activity** Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Begin to prepare the concept map, diagram you will further develop in class on fluid movement in the body.Bring any questions to class. |
| **Assessment 1: Quiz 20%** | *In-class test assessing material taught so far in the semester.*  |
| 6 | **Integumentary System**  | Structure and function of the skin, pathophysiology of the skinHeat and body temperature, practical exercises | *Lecture:* Describe the integumentary system and the role it plays in homeostasis, the layers of the skin and the functions of each layer, the accessory structures of the skin and the functions of each. Changes that occur in the integumentary system during the aging process. Types of membranes and their functions*Discussion/activity*: working in groups students will identify & discuss the three most important functions of the skin. On a worksheet label the parts and the functions of the integumentary system.In groups plan for an activity that will allow them to explain heat transfer, conduction, convection and radiation. | **Pre-reading**Read Chapter 5 of your text book**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Complete chapter 5 and answer the review questions in the text book.Test out your understanding of thermoregulation by the following activity.Students will run along the classroom corridor and up and down the steps then explain what is happening to their body that they are experiencing and explain how that contributes to thermoregulation.  |
| 7 | **Structure and function of the sensory system: the eye** | Structure, function and disorders of the eye.  | *Lecture:* structure & function of the eye. Physiological processes in normal vision. Nursing assessment of the eye. Terminology. *Activity/discussion;* Perform physical assessment of visual and system.Using the case study provided identify the normal and abnormal findings. Report them using the correct terminologyStudents work in pairs & wear blindfolds and try and get from one place to another, with a guide and with & without active support. Reflect & discuss in the larger tutorial group. | **Pre-reading**Review Chapter 5 in your lab manual in relation to the eye.**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Complete the diagrams and other activities in your lab manual. Make sure you’re clear about the terminology and bring questions to class. |
| 8 | **Structure and function of the sensory system: the ear** | Structure, functions and disorders of the ear. Structure and functions of the other sensory systems. Waves: hearing and ultrasound, sight and electromagnetic radiation. | *Lecture:* structure and function of the ear. Physiological processes of hearing. Nursing assessment of the ear. Waves: hearing, ultrasound.*Activity/discussion;* Perform physical assessment of the auditory system.Using the case study provided identify the normal and abnormal findings. Report them using the correct terminology | **Pre-reading**Review Chapter 5 in your lab manual in relation to the ear**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Complete the diagrams and other activities in your lab manual. Make sure you’re clear about the terminology and bring questions to class. |
| **Practice Quiz** | *This test is a formative assessment to help the students assess where they’re up to with their learning. It can be done in-class or as homework. It will assess learning from weeks 6,7,8.* |
| 9 | **Cardiovascular system** | Structure and function of the cardiovascular system. Heart anatomy, properties of cardiac muscle, cardiac physiology.  | *Lecture:* structure and function of the circulatory system. Blood flow, bold resistance, blood pressure, capillary exchange, homeostatic regulation*Lecture:* Size, shape and location of the heart, structure and functions of the heart chambers and the heart valves, pathways of blood through the heart, major blood vessels including the coronary arteries. Shape and location of the heart in the thorax. Major blood vessels including the coronary arteries*Activity/discussion:* Students practice physical assessment including blood pressure, pulse, respirations, first at rest then following physical activity and note and explain any differences | **Pre-reading**Read Chapter 7 in your lab manual;**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning** Read Chapter 19 in your text book. and make sure you Label the diagrams of the heart in your lab manual Ch 7. 7.2.1, 7.2.2, 7.2.3Prepare and bring to class a labelled diagram that illustrates the heart and how blood flows through it. Show which parts have oxygenated blood and which have deoxygenated blood. |
| 10 | **Cardiovascular system** | Application of knowledge of cardiovascular anatomy & physiology to human health functioning | *Lecture:* Integration between the functions of heart and other body’s major organs/system in the maintenance of thermoregulation and control of body temperature, maintaining tissue oxygenation and optimal Ph.*Lecture:* Conduction system of the heart, the use of ECGs for assessment, interpretation of findings.*Activity/discussion:* applying knowledge of cardiac assessment findings. Review provided ECG results and explain what they show and what is happening in the heart. | **Pre-reading**Complete reading Chapter 9 in your text book**Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Complete reading Chapter 19 in your text book. Answer all the review questions and discuss at least 2 of the critical thinking questions with your learning partner. |
| 11 | **Respiratory system** | Structure and function of the respiratory system. Respiration and gas exchange in the body and factors that affect the normal function. | *Lecture:* functional anatomy of the respiratory system* *Activity*/*discussion:* In class, work in groups to list and describe several protective mechanisms of the respiratory system.

Describe the makeup of the respiratory membrane and relate structure to function | Complete workbook activities**Pre-reading****Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning** |
| 12 | **Respiratory system** | The physiology of respiration including mechanism of respiration, ventilation and gas exchange. | *Lecture:* Mechanics of breathing, relate Boyle’s law to events of inspiration and expiration. Explain relative roles of respiratory muscles and lungs elasticity in producing the volume changes that cause the air to flow into and out of the lungs. Gas exchange between the blood, lung and tissues. Control of respiration Describe the neural controls of respiration *Activity/discussion*: Students will work in small group and discuss case scenarios to which will direct them to provide explanation to how respiration has a role in maintenance of -body temperature -tissue oxygenation and body pH -Glucose levels -normal response to injury. | Complete workbook activities**Pre-reading****Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning** |
| **Assessment Quiz 2: 20%** | *In-class quiz to assess the Topic taught in the course weeks 6-12.* |
| 13 | **Microbiology** | Historical background of microbiology. Micro-organisms and parasites. Types, classification, characteristics, growth and identification. Micro-organisms and the human body. Sources of micro-organisms. Normal flora and potential pathogenic micro-organisms. Transmission of micro-organisms. | *Lecture:* Historical background of microbiology. Micro-organisms and parasites. Types, classification, characteristics, growth and identification. Micro-organisms and the human body. Sources of micro-organisms. Normal flora and potential pathogenic micro-organisms. Transmission of micro-organisms. Microbial diseases*Activity and discussion:* WHO guidelines for infection prevention & control | Complete the workbook activities.**Pre-reading****Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Complete the practice quiz and bring it to the next class for discussion and review. |
| 14 | **Microbiology** | Bacteriostatic and antibiotics: action, sensitivity, resistance and hypersensitivity. Infection and immunity: the concept of immunity, active and passive immunity, defence mechanism. Methods of limiting spread of micro-organisms and controlling infection including sanitation, sterilisation, disinfection, asepsis. Use of specific nursing precautions or isolation procedures.  | *Lecture:* Bacteriostatic and antibiotics: action, sensitivity, resistance and hypersensitivity. Infection and immunity: the concept of immunity, active and passive immunity, defence mechanism. *Activity*: Collection and transport of microbiological specimens. Specimen management – labelling, testing and impact and responsibility for nurses | **Pre-reading****Post lecture activity**Review your lecture notes and make sure you understand the concepts outlined**Self-Directed Learning**Access YouTube and search for microbial diseases. Find at least one and review it.You will need to complete the questions in your workbook to demonstrate that you understand the basic concepts associated with microbiology and its importance for nurses. |
| 15 | **Consolidation** | Apply concepts raised in this unit to nursing practice at a beginning level. | *Review and summary:* key learning points from this semester.*Tutorial:* Revision and review | **Self-Directed Learning**Check your notes, make sure you understand the key concepts, go back and revise and review the questions in your lab manual and text book. |
| **End of Semester Exam** | *Examines all of the Topic taught in this unit* |

### Evaluation

* Were topics covered within allocated time
* Was the explanation clear
* Did students complete all activities as planned
* Were objectives met?

If NO, give reasons and make recommendations

## ASSESSMENT

Student assessment in this subject is an integral part of the overall teaching and learning experience. It ranges from informal formative assessment to formal formative and summative assessment. There is continuous informal assessment given prior to formal assessments. The pass mark for this subject is 60%. The table below describes the assessment tasks.

To pass this subject each student must:

* Attend all classroom learning sessions
* Complete all assessments
* Achieve 60% or above in all formative assessments and 60% or above in the summative assessments

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Suggested Assessment Type and Task  | Percentage of Unit Marks  | Unit Learning Outcomes  | Focus Competency Units & Elements  | Focus Course Learning Outcomes  |
| **1. In-class Quizzes** **Task:** Students will undertake 2 quizzes during the semester. The quizzes will Assess student recall and understanding of a block of lecture material. *Students may be offered the quizzes as weekly tests each allocated 10%* | 40%  | 1-9  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1, 2, 3,4, 7  |
| **2. End of Semester Examination** **Task:** Completion of90 multiple choice examination questions. This examination must be passed by students to enable them to gain a passing grade in the unit. One re-sit examination will be provided who fail the examination.  | 50%  | 1-9  | 10.1, 10.2, 11.1, 11.3, 13.2  | 1, 2, 3,4, 7  |

**Resources:**

**There are three texts available on-line for this unit. You will need to download them all and have access to them to complete your work this semester.**

These are open access resources available for both use and adaptation.

**Open Source Anatomy and Physiology**. Available [https://med.libretexts.org/Bookshelves/Anatomy\_and\_Physiology/Anatomy\_and\_Physiology\_2e\_(OpenStax)](https://med.libretexts.org/Bookshelves/Anatomy_and_Physiology/Anatomy_and_Physiology_2e_%28OpenStax%29) This text is disseminated via the Open Education Resource (OER) LibreTexts Project ([https://LibreTexts.org](https://libretexts.org/)), it is freely available for reading, printing and using for teaching & learning.

Wilk*-*Blaszczak, **Human Anatomy Lab Manual** Updated 2023, University of Texas at Arlington. Available [https://med.libretexts.org/Bookshelves/Anatomy\_and\_Physiology/Human\_Anatomy\_Lab\_Manual\_(Wilk-Blaszczak)](https://med.libretexts.org/Bookshelves/Anatomy_and_Physiology/Human_Anatomy_Lab_Manual_%28Wilk-Blaszczak%29)

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