COURSE TITLE	**APPLIED ANATOMY & APPLIED PHYSIOLOGY**
COURSE CODE	**20BN0102**
COURSE CREDITS	**6**

Objective:

1. Describe anatomical terms , Explain the general and microscopic structure of each system of the body,
2. Identify relative positions of the major body organs as well as their general anatomic locations, Explore the effect of alterations in structure
3. Apply knowledge of anatomic structures to analyze clinical situations and therapeutic applications.
4. Develop understanding of the normal functioning of various organ systems of the body
5. Identify the relative contribution of each organ system towards maintenance of homeostasis
6. Describe the effect of alterations in functions, Apply knowledge of physiological basis to analyze clinical situations and therapeutic applications.

Course Outcomes: After completion of this course, student will be able to:

1. Define the terms relative to the anatomical position , Describe the anatomical planes, Define and describe the terms used to describe movements , Organization of human body and structure of cell, tissues membranes and glands, Describe the types of cartilage , Compare and contrast the features of skeletal, smooth and cardiac muscle, Describe the structure of respiratory system , Identify the muscles of respiration and examine their contribution to the mechanism of breathing
2. Describe the structure of digestive system, Describe the structure of circulatory and lymphatic system, Identify the major endocrine glands and describe the structure of endocrine Glands, Describe the structure of various sensory organs, Describe anatomical position and structure of bones and joints , Identify major bones that make up the axial and appendicular skeleton , Classify the joints , Identify the application and implications in nursing , Describe the structure of muscle
3. Apply the knowledge in performing nursing procedures/skills, Describe the structure of renal system, Describe the structure of reproductive system, Describe the structure of nervous system including the distribution of the nerves, nerve plexuses, Describe the ventricular system
4. Describe the physiology of cell, tissues, membranes and glands, Describe the physiology and mechanism of respiration, Identify the muscles of respiration and examine their contribution to the mechanism of breathing, Describe the functions of digestive system, Explain the functions of the heart, and physiology of circulation.
5. Describe the composition and functions of blood,Identify the major endocrine glands and describe their functions, Describe the structure of various sensory organs, Describe the functions of bones, joints, various types of muscles, its special properties and nerves supplying them.
6. Describe the physiology of renal system, Describe the structure of reproductive system, Describe the functions of brain, physiology of nerve stimulus, reflexes, cranial and spinal nerves

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Pre-requisite of course: Applied Anatomy - A basic understanding of human biology – bones, muscles and organs is often a fundamental prerequisite. Applied physiology - A basic understanding of human biology and functioning of systems is often a fundamental prerequisite.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
6	0	0	75	15	10	0	0

Contents : Unit	Topics	Contact Hours
1	**Introduction to anatomical terms and organization of the human body** Introduction to anatomical terms relative to position – anterior, ventral, posterior dorsal, superior, inferior, median, lateral, proximal, distal, superficial, deep, prone, supine, palmar and plantar , Anatomical planes (axial/ transverse/ horizontal, sagittal/vertical plane and coronal/frontal/oblique plane), Movements (flexion, extension, abduction, adduction, medial rotation, lateral rotation, inversion, eversion, supination, pronation, plantar flexion, dorsal flexion and circumduction, Cell structure, Cell division, Tissue – definition, types, characteristics, classification, location, Membrane, glands – classification and structure, Identify major surface and bony landmarks in each body region, Organization of human body, Hyaline, fibro cartilage, elastic cartilage, Features of skeletal, smooth and cardiac muscle, Application and implication in nursing	8
2	**The Respiratory system** Structure of the organs of respiration , Muscles of respiration, Application and implication in nursing	6
3	**The Digestive system** Structure of alimentary canal and accessory organs of digestion, Application and implications in nursing	6
4	**The Circulatory and Lymphatic system** Structure of blood components, blood vessels – Arterial and Venous system, Position of heart relative to the associated structures, Chambers of heart, layers of heart , Heart valves, coronary arteries , Nerve and blood supply to heart , Lymphatic tissue, Veins used for IV injections, Application and implication in nursing	6
5	**The Endocrine system** Structure of Hypothalamus, Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands	4
6	**The Sensory organs** Structure of skin, eye, ear, nose and tongue , Application and implications in nursing	4

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Contents : Unit	Topics	Contact Hours
7	**The Musculoskeletal system** The Skeletal system , Anatomical positions, Bones – types, structure, growth and ossification, Axial and appendicular skeleton , Joints – classification, major joints and structure , Application and implications in nursing, The Muscular system, Types and structure of muscles , Muscle groups – muscles of the head, neck, thorax, abdomen, pelvis, upper limb and lower limbs , Principal muscles – deltoid, biceps, triceps, respiratory, abdominal, pelvic floor, pelvic floor muscles, gluteal muscles and vastus lateralis, Major muscles involved in nursing procedures	10
8	**The Renal system** Structure of kidney, ureters, bladder, urethra , Application and implication in nursing	5
9	**The Reproductive system** Structure of male reproductive organs , Structure of female reproductive organs, Structure of breast	5
10	**The Nervous system** Review Structure of neurons, CNS, ANS and PNS (Central, autonomic and peripheral) , Structure of brain, spinal cord, cranial nerves, spinal nerves, peripheral nerves, functional areas of cerebral cortex, Ventricular system – formation, circulation, and drainage , Application and implication in nursing	6
11	**General Physiology – Basic concepts** Cell physiology including transportation across cell membrane, Body fluid compartments, Distribution of total body fluid, intracellular and extracellular compartments, major electrolytes and maintenance of homeostasis, Cell cycle, Tissue – formation, repair, Membranes and glands – functions, Application and implication in nursing	4
12	**Respiratory system** Functions of respiratory organs, Physiology of respiration, Pulmonary circulation – functional features, Pulmonary ventilation, exchange of gases, Carriage of oxygen and carbon-dioxide, Exchange of gases in tissue, Regulation of respiration, Hypoxia, cyanosis, dyspnea, periodic breathing, Respiratory changes during exercise, Application and implication in nursing	6
13	**Digestive system** Functions of the organs of digestive tract, Saliva – composition, regulation of secretion and functions of saliva, Composition and function of gastric juice, mechanism and regulation of gastric secretion, Composition of pancreatic juice, function, regulation of pancreatic secretion, Functions of liver, gall bladder and pancreas, Composition of bile and function, Secretion and function of small and large intestine, Movements of alimentary tract, Digestion in mouth, stomach, small intestine, large intestine, absorption of food, Application and implications in nursing	8

Contents : Unit	Topics	Contact Hours
14	**Circulatory and Lymphatic system** Functions of heart, conduction system, cardiac cycle, Stroke volume and cardiac output, Blood pressure and Pulse, Circulation – principles, factors influencing blood pressure, pulse, Coronary circulation, Pulmonary and systemic circulation, Heart rate – regulation of heart rate, Normal value and variations, Cardiovascular homeostasis in exercise and posture, Application and implication in nursing	6
15	**Blood** Blood – Functions, Physical characteristics, Formation of blood cells, Erythropoiesis – Functions of RBC, RBC life cycle, WBC – types, functions, Platelets – Function and production of platelets, Clotting mechanism of blood, clotting time, bleeding time, PTT, Hemostasis – role of vasoconstriction, platelet plug formation in hemostasis, coagulation factors, intrinsic and extrinsic pathways of coagulation, Blood groups and types, Functions of reticuloendothelial system, immunity, Application in nursing	5
16	**The Endocrine system** Functions and hormones of Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands., Other hormones, Alterations in disease, Application and implication in nursing	5
17	**The Sensory Organs** Functions of skin, Vision, hearing, taste and smell, Errors of refraction, aging changes, Application and implications in nursing	4
18	**Musculoskeletal system** Bones – Functions, movements of bones of axial and appendicular skeleton, Bone healing, Joints and joint movements, Alteration of joint disease, Properties and Functions of skeletal muscles – mechanism of muscle contraction, Structure and properties of cardiac muscles and smooth muscles, Application and implication in nursing	6
19	**Renal system** Functions of kidney in maintaining homeostasis, GFR, Functions of ureters, bladder and urethra, Micturition, Regulation of renal function, Application and implication in nursing	4
20	**The Reproductive system** Female reproductive system – Menstrual cycle, function and hormones of ovary, oogenesis, fertilization, implantation, Functions of breast, Male reproductive system – Spermatogenesis, hormones and its functions, semen, Application and implication in providing nursing care	4

Contents : Unit	Topics	Contact Hours
21	**Nervous system** Overview of nervous system, Review of types, structure and functions of neurons, Nerve impulse, Review functions of Brain-Medulla, Pons, Cerebrum, Cerebellum, Sensory and Motor Nervous system, Peripheral Nervous system, Autonomic Nervous system, Limbic system and higher mental Functions&#x02;Hippocampus, Thalamus, Hypothalamus, Vestibular apparatus, Functions of cranial nerves, Autonomic functions, Physiology of Pain-somatic, visceral and referred, Reflexes, CSF formation, composition, circulation of CSF, blood brain barrier and blood CSF barrier, Application and implication in nursing	8
Total Hours		**120**

Textbook :

1 Ross and Wilson Applied Anatomy and Applied Physiology in Health and Illness, WMS Johnson (Adapter), Priscilla Johnson (Adapter), SJ Nalini (Adapter) , Elsevier, 2022

References:

1 Ross and Wilson Anatomy and Physiology in Health and Illness, Ross and Wilson Anatomy and Physiology in Health and Illness, Waugh , Oswaal Books And Learning Private Limited, 2022

2 Textbook of Anatomy, Textbook of Anatomy, Inderbir Singh, Jaypee Publications, 2022

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

1 Classroom Teaching

Supplementary Resources:

1 NA

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