

CONO Biomedical Examination Blueprint

Competencies	% of Exam
1. CARDIOVASCULAR SYSTEM	10-12%
<i>1.01 Embryology</i>	
1.01.01 Embryological development of the cardiovascular system, including the valves and chambers of the heart and the blood vessels.	
<i>1.02 Histology</i>	
1.02.01 Microscopic anatomy of the heart and blood vessels.	
<i>1.03 Anatomy</i>	
1.03.01 Location and structure of the heart, major vessels, and pericardium.	
1.03.02 Location and structure of the heart valves.	
1.03.03 Location and branching patterns of coronary arteries.	
1.03.04 Anatomical patterns of the peripheral vascular system.	
1.03.05 Location and structure of microcirculation.	
<i>1.04 Physiology</i>	
1.04.01 Function of the heart valves and their associated sounds in relation to the cardiac cycle.	
1.04.02 Pressure, flow and resistance as it relates to the cardiovascular system.	
1.04.03 Regulation of ventilation, gas exchange and tissue perfusion.	
1.04.04 Autonomic regulation and electrical conduction of the cardiac muscle.	
1.04.05 Electrical measurement of the heart.	
1.04.06 Forces involved in the circulation of blood and lymph, and the regulation of blood flow.	
1.04.07 Physiological adaptive changes related to exercise.	
<i>1.05 Biochemistry</i>	
1.05.01 Metabolic pathways of the heart	
<i>1.06 Genetics</i>	
1.06.01 Gene expression and consequences of the genetic abnormalities that underlie cardiovascular disease processes	
<i>1.07 Microbiology</i>	
1.07.01 Role of infectious agents involved in cardiovascular disease	
<i>1.08 Pathology</i>	
1.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the cardiovascular system	
2. ENDOCRINE SYSTEM	9-11%
<i>2.01 Embryology</i>	
2.01.01 Embryological development of the organs of the endocrine system	
<i>2.02 Histology</i>	
2.02.01 Microscopic anatomy of the endocrine system	
<i>2.03 Anatomy</i>	
2.03.01 Location and structure of the endocrine organs	

Competencies	% of Exam
2.03.02 Location and structure of the circulatory pathways of blood related to the endocrine organs	
<i>2.04 Physiology</i>	
2.04.01 Mechanisms and functions of endocrine organs.	
2.04.02 Hormonal functions, synthesis, release, transport and feedback.	
2.04.03 Hormonal changes occurring during puberty.	
2.04.04 Hormonal changes occurring during aging.	
2.04.05 Physiological adaptive changes related to stress.	
<i>2.05 Biochemistry</i>	
2.05.01 Metabolic pathways related to the endocrine system.	
2.05.02 Synthesis of hormones.	
<i>2.06 Genetics</i>	
2.06.01 Gene expression and consequences of the genetic abnormalities that underlie endocrine disorders.	
<i>2.07 Microbiology</i>	
2.07.01 Role of infectious agents involved in endocrine disorders.	
<i>2.08 Pathology</i>	
2.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the endocrine system.	
3. GASTROINTESTINAL SYSTEM	10-12%
<i>3.01 Embryology</i>	
3.01.01 Embryological development of the gastrointestinal tract and glands.	
<i>3.02 Histology</i>	
3.02.01 Microscopic anatomy of the gastrointestinal tract and related organs.	
<i>3.03 Anatomy</i>	
3.03.01 Location and structure of the organs and glands of the gastrointestinal system.	
3.03.02 Location and structure of the circulatory pathways of blood related to the gastrointestinal system.	
<i>3.04 Physiology</i>	
3.04.01 Mechanisms and functions of the gastrointestinal organs and glands.	
3.04.02 Processes and regulation of digestion, absorption, and elimination.	
3.04.03 Immune functions of the gastrointestinal system.	
<i>3.05 Biochemistry</i>	
3.05.01 Structure, absorption, transport, mechanism of action, and function of vitamins and minerals.	
3.05.02 Metabolism of carbohydrates, fats, proteins.	
3.05.03 Metabolism of essential and non-essential nutrients (fatty acids and amino acids).	
3.05.04 Bilirubin metabolism and detoxification pathways.	
<i>3.06 Genetics</i>	

Competencies	% of Exam
3.06.01 Gene expression and consequences of the genetic abnormalities that underlie gastrointestinal disease processes.	
<i>3.07 Microbiology</i>	
3.07.01 Role of the microbiome in the processes of digestion, nutrient production, absorption, and elimination.	
3.07.02 Role of infectious agents in the gastrointestinal system.	
<i>3.08 Pathology</i>	
3.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the gastrointestinal system.	
4. HEMATOPOIETIC SYSTEM	6-8%
<i>4.01 Embryology</i>	
4.01.01 Role of stem cells in hematopoiesis.	
<i>4.02 Histology</i>	
4.02.01 Microscopic anatomy and origins of blood cells.	
<i>4.03 Anatomy</i>	
4.03.01 Location and structure of the hematopoietic system.	
<i>4.04 Physiology</i>	
4.04.01 Composition and function of blood cells and plasma.	
4.04.02 Synthesis and degradation of blood cells.	
4.04.03 Maturation of blood cells.	
4.04.04 Mechanisms and regulation of hematopoiesis and hemostasis.	
<i>4.05 Biochemistry</i>	
4.05.01 Metabolic pathways related to the hematopoietic system.	
<i>4.06 Genetics</i>	
4.06.01 Gene expression and consequences of the genetic abnormalities that underlie hematopoietic disease processes.	
<i>4.07 Microbiology</i>	
4.07.01 Role of infectious agents involved in the hematopoietic system.	
<i>4.08 Pathology</i>	
4.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the hematopoietic system.	
5. IMMUNE SYSTEM	10-12%
<i>5.01 Embryology</i>	
5.01.01 Embryological development of the immune system.	
<i>5.02 Histology</i>	
5.02.01 Microscopic anatomy of the lymphoid organs.	
<i>5.03 Anatomy</i>	
5.03.01 Location and structure of the lymphatic system.	
5.03.02 Location and structure of the lymphoid organs.	
<i>5.04 Physiology</i>	
5.04.01 Processes involved in innate immunity.	

Competencies	% of Exam
5.04.02 Processes involved in adaptive immunity.	
5.04.03 Functions of cells, antibodies, and cytokines in humoral and cell-mediated immunity.	
5.04.04 Structure and function of histocompatibility antigens and their associated diseases.	
5.04.05 Pathways of cellular and cytokine signaling in response to injury, infection, and foreign bodies.	
5.04.05 Structure, function, and pathways of complement compounds.	
5.04.06 Functions and regulation of lymphatic fluid and lymphoid organs.	
5.05 Biochemistry	
5.05.01 Metabolic pathways related to the immune system.	
5.05.02 Biochemistry of synthesis and degradation of lymphatic fluid and its components.	
5.06 Genetics	
5.06.01 Gene expression and consequences of the genetic abnormalities that underlie immunological disease processes.	
5.07 Microbiology	
5.07.01 Classification of viruses, bacteria, fungi, protozoa, and helminths based on structural and biological characteristics.	
5.08 Pathology	
5.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the immune system.	
6. INTEGUMENTARY SYSTEM	6-8%
6.01 Embryology	
6.01.01 Embryological development of the ectoderm.	
6.02 Histology	
6.02.01 Microscopic anatomy of the layers of the skin and dermal-epidermal junction and normal pigmentation.	
6.02.02 Microscopic anatomy of nails, hair follicles, and associated structures.	
6.02.03 Microscopic anatomy of glands associated with the integumentary system.	
6.03 Anatomy	
--No competency for this category--	
6.04 Physiology	
6.04.01 Physiological processes related to injury, including cellular injury and adaptive change.	
6.04.02 Temperature regulation and sensory reception.	
6.04.03 Absorption and elimination functions of the integumentary system.	
6.04.04 Protective functions of the integumentary system.	
6.05 Biochemistry	
6.05.01 Synthesis of vitamin D in skin.	
6.05.02 The role of essential and non-essential nutrients associated with the structure and function of the integumentary system.	

Competencies	% of Exam
<i>6.06 Genetics</i>	
6.06.01 Gene expression and consequences of the genetic abnormalities that underlie integumentary disease processes.	
<i>6.07 Microbiology</i>	
6.07.01 Characteristics and role of normal flora and role of infectious agents in dermatological conditions.	
<i>6.08 Pathology</i>	
6.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the integumentary system.	
7. MUSCULOSKELETAL SYSTEM	7-9%
<i>7.01 Embryology</i>	
7.01.01 Embryological development of the musculoskeletal system including muscle, bone, connective tissue, and joints.	
<i>7.02 Histology</i>	
7.02.01 Microscopic anatomy of the musculoskeletal system including muscles, bones, and joints.	
<i>7.03 Anatomy</i>	
7.03.01 Classification, location and structure of the different types of joints in the body.	
7.03.02 Origin, insertion, main action, and innervation of the muscles and ligaments of the body.	
7.03.03 Classification, location and structure of the bones of the body.	
<i>7.04 Physiology</i>	
7.04.01 Mechanisms and factors affecting contraction of skeletal, smooth, and cardiac muscle.	
7.04.02 Function of connective tissues of the musculoskeletal system.	
7.04.03 Physiological adaptive changes to the musculoskeletal system in response to fasting and exercise.	
7.04.04 Remodeling and repair of osseous and cartilaginous structures and the nutrients affecting it.	
7.04.06 Integrative functions of the musculoskeletal system related to proprioception, posture, venous return, and lymphatic flow.	
<i>7.05 Biochemistry</i>	
7.05.01 Metabolic pathways of the musculoskeletal system.	
<i>7.06 Genetics</i>	
7.06.01 Gene expression and consequences of the genetic abnormalities that underlie musculoskeletal disease processes.	
<i>7.07 Microbiology</i>	
--No competency for this category--	
<i>7.08 Pathology</i>	
7.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the musculoskeletal system.	

Competencies	% of Exam
8. NEUROLOGICAL SYSTEM	10-12%
<i>8.01 Embryology</i>	
8.01.01 Embryological development of the neural tube and its derivatives.	
<i>8.02 Histology</i>	
8.02.01 Microscopic anatomy of neurons and neuroglia.	
<i>8.03 Anatomy</i>	
8.03.01 Location and structure of the central nervous system and cranial nerves.	
8.03.02 Location and structure of the peripheral nervous system and spinal nerves.	
8.03.03 Structures involved in special senses.	
8.03.04 Pathways of the cerebral blood supply and flow of cerebrospinal fluid.	
<i>8.04 Physiology</i>	
8.04.01 Functions and components of the brain and spinal cord.	
8.04.02 Functions and pathways of the cranial nerves.	
8.04.03 Function of the peripheral nervous system.	
8.04.04 Pathways and functions of the autonomic nervous system.	
8.04.05 Pathways and functions of the somatic nervous system.	
8.04.06 Pathways and functions of the special senses and associated structures.	
8.04.07 Regulation of synaptic transmission, graded potentials, action potential, and axon conduction.	
<i>8.05 Biochemistry</i>	
8.05.01 Metabolic pathways of the neurological system.	
8.05.02 Neurotransmitter synthesis, function, and degradation.	
<i>8.06 Genetics</i>	
8.06.01 Gene expression and consequences of the genetic abnormalities that underlie neurological disease processes.	
<i>8.07 Microbiology</i>	
8.07.01 Infectious agents of the neurological system.	
<i>8.08 Pathology</i>	
8.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the nervous system.	
9. PULMONARY SYSTEM	7-9%
<i>9.01 Embryology</i>	
9.01.01 Embryological development of the respiratory tract.	
<i>9.02 Histology</i>	
9.02.01 Microscopic anatomy of the respiratory tract.	
<i>9.03 Anatomy</i>	
9.03.01 Location and structure of the upper respiratory tract.	
9.03.02 Location and structure of the thorax in relation to the pleura, lungs, heart, mediastinum, and diaphragm.	
<i>9.04 Physiology</i>	
9.04.01 Circulation of blood and the flow of air in the lungs.	

Competencies	% of Exam
9.04.02 Regulation of ventilation.	
9.04.03 Regulation of gas exchange and tissue perfusion.	
9.04.04 Physiological adaptive changes related to exercise and environmental factors.	
9.04.05 Non-respiratory functions of the pulmonary system.	
<i>9.05 Biochemistry</i>	
9.05.01 Metabolic pathways of the pulmonary system.	
<i>9.06 Genetics</i>	
9.06.01 Gene expression and consequences of the genetic abnormalities that underlie pulmonary disease processes.	
<i>9.07 Microbiology</i>	
9.07.01 Infectious agents of the pulmonary system.	
<i>9.08 Pathology</i>	
9.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the pulmonary system.	
10. SEXUAL HEALTH	8-10%
<i>10.01 Embryology</i>	
10.01.01 Embryological development of the sexual organs, the placenta, and the breast.	
10.01.02 Developmental processes related to gametogenesis, implantation, and embryogenesis.	
<i>10.02 Histology</i>	
10.02.01 Microscopic anatomy of the sexual organs and the breast.	
<i>10.03 Anatomy</i>	
10.03.01 Location and structure of the sexual organs and breast.	
<i>10.04 Physiology</i>	
10.04.01 Mechanisms of sexual arousal and response.	
10.04.02 Regulation of hormones related to sexual functions.	
10.04.03 Regulation of menstruation.	
10.04.04 Regulation of oogenesis and spermatogenesis.	
10.04.05 Physiological adaptations related to pregnancy.	
10.04.06 Regulation of lactation.	
<i>10.05 Biochemistry</i>	
10.05.01 Biochemistry of hormone synthesis and degradation related to sexual functions.	
10.05.02 Metabolic pathways of the reproductive system.	
<i>10.06 Genetics</i>	
10.06.01 Gene expression and consequences of the genetic abnormalities that underlie reproductive disease processes.	
<i>10.07 Microbiology</i>	
10.07.01 Characteristics of infectious agents involved in sexually transmitted infections.	
<i>10.08 Pathology</i>	

Competencies	% of Exam
10.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the reproductive system.	
11. URINARY SYSTEM	6-8%
<i>11.01 Embryology</i>	
11.01.01 Embryological development of the urinary system.	
<i>11.02 Histology</i>	
11.02.01 Microscopic anatomy of the urinary system.	
<i>11.03 Anatomy</i>	
11.03.01 Location and structure of the urinary system.	
<i>11.04 Physiology</i>	
11.04.01 Circulation of blood in the urinary system.	
11.04.02 Regulation of urinary filtration, re-absorption, and secretion.	
11.04.03 Regulation of blood pressure and red blood cell production.	
11.04.04 Regulation of fluids, osmolality, electrolytes, vitamins, minerals, and pH.	
<i>11.05 Biochemistry</i>	
11.05.01 Metabolic pathways of the urinary system.	
<i>11.06 Genetics</i>	
11.06.01 Gene expression and consequences of the genetic abnormalities that underlie urinary disease processes.	
<i>11.07 Microbiology</i>	
11.07.01 Infectious agents of the urinary system.	
<i>11.08 Pathology</i>	
11.08.01 Pathogenesis and etiology, risk factors, complications, and clinical characteristics of common conditions related to the urinary system.	

Other Blueprint Parameters

Patient Population	% of Exam
Pediatric (0-14)	10-20%
Adult (15-49)	30-40%
Older Adult (50-65)	30-40%
Geriatric (over 65)	10-20%

Item Type	% of Exam
Independent	100%

Taxonomy (Cognitive Level)	% of Exam
Knowledge/Comprehension	91-95%
Application	5-9%