Subject Program

Subject Identification

Organic Unity

Course: [IS] Informática para a Saúde

Subject/Module: Anatomia e Fisiologia

Scientific Field: Basic Sciences

Year: 1º Semester: 1º

Prerequisites: None.

Hours Of Workload

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory Classes (TC)</td>
<td>30:00</td>
</tr>
<tr>
<td>Theory-Practice (TP)</td>
<td>15:00</td>
</tr>
<tr>
<td>Practical Laboratory (PL)</td>
<td>15:00</td>
</tr>
<tr>
<td>Tutorial (T)</td>
<td>5:00</td>
</tr>
<tr>
<td>Hours of Autonomous Work</td>
<td>97:00</td>
</tr>
<tr>
<td>Horas Totais</td>
<td>162:00</td>
</tr>
</tbody>
</table>

Lecturing Language: Portuguese

Lecturers

Main Lecturer: Joaquim Rui de Castro Rodrigues

Lecturers

Joaquim Rui de Castro Rodrigues

Framework

This module is part of the basic sciences area of the course of “Informática para a Saúde” and provides the student with general skills of human anatomy and physiology related to important concepts for the course.

Objectives/Skills

General
C1. Proper use of anatomical nomenclature

C2. Knowledge of anatomy and physiology of the major organ systems of the human body

Specific

C1.1 To know the fundamental concepts in anatomy and physiology

To recognize the body's levels of organization. To name the major types of tissues. To describe the anatomical position. To distinguish between the anatomical planes. To use proper anatomical terminology to describe body directions. To know the divisions of the human body, the cavities of the trunk and the location of the organs. Understand the concepts of homeostasis, negative feedback and positive feedback.

C2.1 To know the anatomy and physiology of the skeletal system

To identify the major constituents of the skeletal system. To know the functions of the skeletal system. To identify the four main groups of bones. To use proper bone markings terminology. To classify a joint by the degree of joint mobility. To know the human skeleton. To use the proper nomenclature for the description of motion. To know the general structure of a synovial joint and knee joint in particular.

C2.2 To know the anatomy and physiology of the muscular system

To identify the functions of the muscular system. To identify the general properties of the muscles. To distinguish the basic types of muscle tissue. To characterize the overall structure of skeletal muscle. To know the basic structure of the sarcomere and link it with the sliding filaments model. To explain the basic functioning of the neuromuscular junction. To explain the phenomena of summation of multiple motor units, treppe, tetanus, isotonic contractions and isometric contractions. To identify sources of energy for muscle contraction. To cite criteria used in naming muscles and identify the main superficial muscles.

C2.3 To know the anatomy and physiology of the nervous system

To know the functions of the nervous system. To know the divisions of the nervous system. To recognize the neurons and glial cells as the cells of the nervous system. To interpret the basic phenomena that occurs in the action potential and synapse. To identify in anatomical models the basic components of the central nervous system: subdivisions of the spinal cord and brain: the cerebrum, the diencephalon and its subdivisions, the brain stem and its subdivisions, and the cerebellum. Enumerate the cranial nerves and spinal nerves. To know the structure and function of the meninges.

C2.4 To know the anatomy and physiology of the endocrine system

To compare and contrast the nervous and endocrine systems as body-regulating systems. To identify the main types of chemical signals. To recognize the general characteristics of hormonal response. To know the functions of the endocrine system. To relate the structure of the hypothalamus and the pituitary gland with their functions. To know the hormones secreted by the hypothalamus and the pituitary. To discuss the effects of growth hormone disorders. To know the thyroid hormones. To relate conditions such as goiter, cretinism and Graves' disease with thyroid function. To explain the role of calcitonin and parathyroid hormone in the regulation of calcium levels in the blood. To recognize the medulla and the cortex as two distinct regions of the adrenal glands. To know the overall effects of the main hormones of the adrenal glands. To recognize the role of the endocrine and exocrine pancreas. To interpret the role of insulin and glucagon in the regulation of blood glucose. To understand the physiological basis of diabetes. To know the role of hormones produced by the gonads, the pineal gland and thymus.

C2.5 To know the anatomy and physiology of the respiratory system

To define respiration. To know the structure and function of the respiratory system organs. To relate the different respiratory volumes and capacities. To enumerate the functions of respiratory system. To explain the chemical bases of acidosis and alkalosis and interpret the body’s response. To identify the centers of breath control.
C2.6 To know the anatomy and physiology of the circulatory system

To know the constitution of blood. To know the various types of white blood cells. To explain the role of erythropoietin in regulating the production of red blood cells. To know in general terms the process of recycling of hemoglobin and recognize bilirubin as the main product of heme metabolism. To characterize the AB0 and Rh blood groups and their role in transfusions. To link the structure of the heart with its function. To differentiate between systemic and pulmonary circulation. To describe the cardiac cycle and relate it with the conduction system, the electrocardiogram and the heart sounds. To know the structure and function of the pericardium. To compare and contrast the structure of different types of blood vessels. To identify the major blood vessels. To define concepts such as blood flow, blood pressure and pulse.

C2.7 To know the anatomy and physiology of the digestive system

To identify the basic processes of the digestive system such as mixing, secretion, digestion, absorption and elimination. To identify the mucosa, submucosa, muscular and serosa or adventitia as constituents of the overall structure of the digestive tract. To identify the organs that makes up the digestive tract. To identify the role of the digestive glands: salivary glands, liver, gallbladder and pancreas. To know the organization and function of the peritoneum.

C2.8 To know the anatomy and physiology of the urinary system

To know the component of the urinary system: kidneys, ureters, bladder and urethra. To recognize the nephron as the structural and functional unit of the kidney. To link the tubular and vascular structure of the nephron with the production of urine. To explain in general terms the processes of filtration, reabsorption and secretion. To enumerate the functions of the urinary system.

C2.9 To know the anatomy and physiology of the lymphatic system

To identify the functions of the lymphatic system. To characterize the lymph. To describe the lymphatic circulation and the types of lymphatic vessels. To identify the encapsulated and non-encapsulated lymphatic organs.

C2.10 To know the anatomy and physiology the reproductive system

To know the anatomy of the male reproductive system. To describe the process of spermatogenesis. To describe the regulation of secretion of sex hormones. To know the anatomy of the female reproductive system. To link and explain the menstrual cycle, ovarian cycle, uterine cycle and oogenesis.

Transversal

C3. Ability to work as a team.

C4. Ability to study independently.

Contents

Synopsis

1. introduction to anatomy and physiology
2. skeletal system
3. muscular system
4. nervous system
5. endocrine system
6. respiratory system
7. circulatory system
8. digestive system
9. urinary system
10. lymphatic system
11. reproductive system

**Complete**

1. Introduction to anatomy and physiology
   1.1 Levels of organization of the body
   1.2 Main types of tissue
   1.3 Anatomical position and anatomical planes
   1.4 Descriptive Terms
   1.5 Division of the human body
   1.6 Cavities of the trunk
   1.7 Homeostasis
   1.8 Negative and positive feedback
2. Skeletal System
   2.1 Components of the skeletal system
   2.2 Functions of the skeleton
   2.3 Classification of bones
   2.4 Bone terminology
   2.5 The human skeleton
   2.6 Classification of joints and the degree of mobility
   2.7 Movements
   2.8 The synovial joint
   2.9 The knee joint
3. Muscular System
   3.1 Functions of the muscular system
   3.2 Types of muscle tissue
   3.3 Structure of skeletal muscle
3.4 The sarcomere and the sliding filament model
3.5 Neuromuscular junction
3.6 Twitching
3.7 Principles of nomenclature and main surface muscles
4. Nervous system
4.1 Nervous system functions
4.2 Divisions of the nervous system
4.3 Nervous system cells
4.4 Action potential
4.5 Basic anatomy of the central nervous system
4.6 Overall structure of nerves
4.7 Cranial and spinal nerves
5. Endocrine system
5.1 Types of chemical signals
5.2 General characteristics of the hormonal response
5.3 Functions of the endocrine system
5.4 Pituitary and hypothalamus
5.5 Thyroid
5.6 Parathyroid
5.7 Adrenal glands
5.8 Pancreas
5.9 Gonads
5.10 Pineal gland
5.11 Thymus
6. Respiratory system
6.1 Concept of respiration
6.2 Basic anatomy of the respiratory system
6.3 Respiratory volumes and capacities
6.4 Functions of the respiratory system
7. Circulatory system
7.1 Blood
7.2 Regulation of the production of red blood cells
7.3 Heart anatomy, conduction system and cardiac cycle
7.4 The electrocardiogram
7.5 General structure of blood vessels
7.6 Major blood vessels
8. Digestive System
8.1 Functions of the digestive system
8.2 General structure of the digestive tract
8.3 Alimentary canal
8.4 Swallowing
8.5 The digestive glands
9. Urinary System
9.1 General anatomy of the urinary system
9.2 The nephron and mechanism of urine production
9.3 Functions of the urinary system
10. Lymphatic system
10.1 Lymph
10.2 Functions of the lymphatic system
10.3 Vessels and lymphatic circulation
10.4 Lymphatic organs
11. Reproductive System
11.1 Anatomy of the male reproductive system
11.2 Spermatogenesis
11.3 Regulation of secretion of sex hormones
11.4 Anatomy of the female reproductive system
11.5 Menstrual cycle and oogenesis

Demonstration of the coherence of the contents with the objectives/skills of the subject

The syllabus taught contribute to the skills set for the module as follows

1. introduction to anatomy and physiology(C1)
2. skeletal system (C1 C2.1)
3. muscular system (C1 C2.2)
4. nervous system (C1 C2.3)
5. endocrine system (C1 C2.4)
6. respiratory system (C1 C2.5)
7. circulatory system (C1 C2.6)
8. digestive system (C1 C2.7)
9. urinary system (C1 C2.8)
10. lymphatic system (C1 C2.9)
11. reproductive system (C1 C2.10)
Teaching/Learning Methodology

Contact and Autonomous

1. Study
   1.1 Reading of excerpts from the module recommended reading
   1.2 Resolution of the exercises recommended by the module
2. E-learning
   2.1 Consultation of learning materials on the module

1. Theoretical teaching: Presentation and discussion of syllabus
2. Theoretical-practical: Realization of worksheets
3. Practical and Laboratory: Exploration of anatomical models
4. Tutorial sessions: Monitoring of students in groups of defined composition involving close contact in informal meetings held in pre-defined place and time.

Specific Resources

1. Theoretical teaching: regular classroom
2. Theoretical and practical teaching: the anatomy lab (Escola Superior de Saúde)
3. Practical and laboratory teaching: the anatomy lab (Escola Superior de Saúde)
4. Tutorial orientation: cabinet or regular classroom

Demonstration of the coherence of the teaching/learning methodology with the objectives/skills of the subject

The teaching methods used contribute to the skills set for the module as follows:

Contact study

1. Theoretical teaching: Presentation and discussion of syllabus (C1 C2)
2. Theoretical-practical: Realization of worksheets (C1 C2 C3 C4)
3. Practical and Laboratory: Exploration of anatomical models (C1 C2 C3)
4. Tutorial Orientation: Monitoring of students in groups of defined composition involving close contact in informal meetings held in pre-defined place and time (C1 C2)

Autonomous study

1. Study

1.1 Reading of excerpts from the module recommended reading (C1 C2 C4)

1.2 Resolution of the exercises recommended by the module (C1 C2 C4)

2. E-learning

2.1 Consultation of learning materials on the module (C1 C2 C4)

Assessment

Description

Continuous assessment:
- 10% attendance and participation in class
- 45% first written assessment
- 45% second written assessment

Final assessment:
- exam

Number of Evaluations

Continuous/Periodic 2
Final 1

Bibliography

Main
- Seeley, Stephens & Tate, Anatomia e Fisiologia, Lusodidacta, 6th ed., 2005
- Teaching materials

Complementary
• Guyton, Textbook of medical physiology, WB Saunders Company, 10th Ed, 2005
• Pina, Anatomia humana da locomoção, Lidel, 4th ed, 2010

Approval
Approved by CTC in: 06-01-2012