SAGRADO
Universidad del Sagrado Corazón

SCHOOL OF HEALTH AND SCIENCES

SYLLABUS

TITLE:	Human Biology I
CODE:	BIO 101
PREREQUISITE:	N/A
CORREQUISITE:	BIO 101L
CREDITS:	3 credits | 30 contact hours | 45 lab hours | 1 term

DESCRIPTION

This course is an introduction to human anatomy and physiology. It is a theoretical and practical course that emphasizes the structure and functioning of the human body's organs and systems. The course is aimed at undergraduate students in Nursing, Exercise Sciences, and Psychology, as well as students of graduate programs who are required to have this knowledge, such as the Physical Therapy and Speech Pathology programs. The course presents, with images, interactive models, and cases management, the levels-of-organization model, and from this, it ventures into the study of the cell, the fundamental tissues, the skin, and the immune, circulatory, respiratory, nervous (special senses included), and endocrine systems. The importance of knowing them is demonstrated by their usefulness in the clinic and in everyday life.

JUSTIFICATION

Human anatomy and physiology have always been considered the foundation for the education of health and allied sciences professionals. The exact and precise knowledge of the structures of the human body, the functions of organisms, and the clinical correlations that they entail are essential for the understanding of the subject matter taught in the courses and clinical practices of the Nursing Program and any other program that trains health and allied sciences professionals.

COMPETENCES

The course develops the following competences in students:

- **Critical questioning**
- **Research and exploration**

OBJECTIVES

After completion of the course, students will be able to:

1. Identify, in an illustration, the anatomical regions, abdominal quadrants, and the structures that form the systems under study.
2. Identify, in a video, diagram, or real-life situation, the position, plane, or movement illustrated, and the fundamental tissues and their functions in an organ of the body; in a video or drawing, the parts of a cell and its functions, and the organs and functions of the systems studied in the course.
3. Outline the levels of organization of the human body; the layers of the skin, its appendages, and functions; the anatomy of the heart and blood and lymphatic circulation; the airways and gas exchange; the nervous system and its divisions.
4. Write a glossary of the terms presented by topic.
5. Match the structures studied by topic with their function and the main neurotransmitters with their basic functions.
6. Explain the fundamental definitions of anatomy and physiology and their main branches; the effect an enzyme deficiency has in the metabolism; what is cancer from the perspective of cell reproduction; the basics of a blood transfusion and the listed respiratory phenomena.
7. Propose a basic explanation (to patients or students) about the processes carried out by the organs and systems studied in this course.
8. Analyze the role of cellular processes in a person who is losing fluids, either due to sweating, vomiting or diarrhea, and the information gathered as a group about a problem that affects the homeostasis of any of the systems studied in the course.
9. Estimate the stage of healing and the type of intervention when treating a wound according to the time elapsed.
10. Correlate the cardiac cycle with blood circulation, heartbeat, pulse, and electrocardiographic wave.
11. Integrate the systems of the human body in exercises of everyday life situations or clinical cases.
12. Participate, as a team, in the design of a strategic plan of simple implementation to protect the cells, organs, or systems studied.
13. Gather, as a team, information from people on a socioeconomic issue that affects homeostasis.

CONTENTS

3. Nucleus
4. Fundamental organelles
5. Cytoskeleton

C. Cellular processes
1. Passive transport: diffusion
2. Active transport: sodium-potassium pump
3. Phagocytosis
4. Pinocytosis
5. Clinical case: physiological foundations of hydration

D. Cellular metabolism
1. Definition
2. Enzymatic actions
3. Concept of homeostasis
4. Fever: a phenomenon that can alter enzymes

VI. Cellular Reproduction

A. Mitosis and meiosis
1. Differentiating the two processes
2. Knowing the characteristics of each of the phases

B. Cellular genetics
1. DNA
    a. Function
    b. Chemical composition
2. RNA
    a. Function
    b. Chemical composition
3. Protein synthesis
    a. Transcription
    b. Translation

C. Cancer from the perspective of human biology

VII. Basic Histology

A. The fundamental tissues: characteristics and functions
1. Epithelium
2. Connective tissue

3. Muscle tissue
    a. Differentiate the three types
4. Nervous tissue
    a. Neuron and neuroglia
    b. Receptors and synapses
5. Clinical cases

VIII. The Skin: Structure and Function

A. Functions
B. The two fundamental layers: epidermis and dermis
C. Touch
D. Appendages
E. Subcutaneous tissue
F. Wounds
    1. Healing time
    2. Factors influencing healing
    3. Sutures
    4. Antisepsis and asepsis
G. Burns: A wound analyzed

IX. Circulatory System

A. Blood
    1. Functions
    2. Blood volume
    3. Histology of vascular tissue
        a. Plasma and serum
        b. Leukocytes
        c. Erythrocytes
        d. Platelets
    4. Blood groups
        a. ABO group
        b. Rh factor
        c. Blood transfusions
    5. The body's immunity mechanisms
        a. The reticuloendothelial system

        b. Cellular immunity
    B. The heart
        1. Anatomy
        2. Cardiac control system and nervous control
            a. Pacemakers
            b. Electrocardiogram
            c. Cardiac nerves
        3. Cardiac cycle and sounds
        4. Cardiac output and ejection fraction
        5. Blood pressure and pulse pressure
    C. Blood vessels: structure and function
        1. Arteries and their derivatives
        2. Veins and their derivatives
        3. The capillary network
        4. Atherosclerosis and aneurysms
    D. Circulation
        1. Coronary
        2. Pulmonary
        3. Systemic circulation and its derivatives
        4. Portal
        5. Fetal
    E. Pulse
        1. Definition
        2. Major clinical pulse points
X. Lymphatic system
    A. Anatomy
        1. Lymphatic vessels
        2. Lymph nodes
        3. The spleen
    B. What is lymph and what is it for?
    C. Lymph circulation mechanism
    D. Lymphoma and lymphadenopathy
XI. Respiratory system

A. Functions
B. Anatomy
    1. The upper airways: structure and function
    2. The lower airways: structure and function
    3. Respiratory muscles
C. Physiology
    1. Ventilation: neurogenic nerves and control centers
    2. Changes in volume and pressure that occur during ventilation movements
    3. Chemical and nervous control of ventilation
    4. Atmospheric pressure and oxygen volume
    5. Gas exchange and transport
    6. Respiratory phenomena
        a. Coughs
        b. Sneezes
        c. Yawns
        d. Hiccups
    7. Pathologies of the respiratory system
        a. Rhinitis, sinusitis, bronchitis, pneumonia, emphysema, COPD, asthma, pulmonary edema, embolism, tuberculosis

XII. Nervous System
A. The basic circuit: synaptic transmission
B. The fundamental neurotransmitters
C. The reflex arc with clinical examples
D. Central nervous system: structure and function
    1. Meninges
    2. Cerebrospinal fluid: composition and circulation
    3. The brain: main lobes and nuclei with their fundamental functions
    4. Brain stem
    5. Spinal cord
E. Peripheral nervous system
    1. Cranial nerves and special senses
        a. Smell

b. Taste
c. Sight
d. Hearing
e. Balance

2. Spinal nerves: components

F. Autonomic nervous system
1. Sympathetic division
2. Parasympathetic division

G. Clinical correlations: hydrocephalus, brain death, dementia, depression, schizophrenia

XIII. Endocrine system

A. General functions
B. Definition of hormone
C. Feedback mechanisms
D. Endocrine glands: anatomy, main hormones, and their effects
E. Pathologies caused by hormonal hypersecretion and hyposecretion

LABORATORY EXPERIENCES

- Use and management of the microscope
- Mitosis and meiosis models
- Types of tissues
- Hematology
- Cardiovascular system
- Respiratory system
- Nervous system
- Endocrine system

METHODOLOGY

The following strategies from the active learning methodology are recommended:

- Storytelling-like conferences that link concepts with the whole reality of the organism.
- Inverted classroom to discuss clinical cases.
- Questions exercises for students to develop answers to fundamental challenges in human biology.
- Work groups in which students distribute their tasks, integrate information, and

assess their peers to verify learning among group members.

- Incorporation of interactive animated models such as Visible Body, BioDigital, KenHub, and Smart Sparrow, in conferences and presentations.
- Quizzes in which students color, draw or diagram the concepts, structures, and processes of human biology.
- Partial exams with case analysis to stimulate the development of critical thinking and the use of studied concepts, processes, and structures.
- On-site or virtual clinical demonstrations that illustrate the concept, structure, or process under study.
- Immersion project to encourage research-based learning. In this course, students carry out two fieldwork activities in teams. In these activities they gather information on topics that affect the correct functioning of the body and the mind. Students organize, discuss, and analyze their findings within the biopsychosocial context and present a written or oral group report that requires them to include the design of a strategic plan tempered to the reality of the people involved in order to perform an effective intervention.

EVALUATION

Participation	10%
Partial assignments	30%
Oral presentation	10%
Final project or exam	25%
Immersion experience	25%
Total	**100%**

LEARNING ASSESSMENT

The institutional assessment rubric is applied to the course's core activity.

BIBLIOGRAPHY

TEXTBOOK

Patton, K. & Thibodeau, G. (2019). *Structure and Function*. (16th ed.). Mosby.

SUGGESTED COLORING BOOK, ATLAS, AND LABORATORY MANUAL

Hansen, J.T. (2018). *Netter's Anatomy Coloring Book.* (2nd ed.). Elsevier.

Netter, F. (2018). *Atlas of Human Anatomy.* (7th ed.). Elsevier.

Patton, K. (2016). *Anatomy & Physiology: Laboratory Manual.* (9th ed.). Elsevier

REFERENCES

De Jesús, J. (2020). Hipotiroidismo e hipocampo: su relación con la memoria y la concentración. *Galenus, 79*(6), 48-49.

Finkel, M. (2018, August). While We Sleep. *National Geographic*, 40-77.

Mercedes, I. (2020). Quemaduras: una breve revisión. *Galenus*, *79*(6), 71-75.

Pérez Feliciano, R. (2020). La fibrilación auricular y sus complicaciones: una amenaza a la salud pública. *Galenus*, *79*(6), 86-87.

Rivera Gautier, G. (2019). La salud cardiovascular: una decisión y forma de vivir. *Galenus*, *77*(4), 22-23.

Villanueva-Meyer, M. (2019). Historia de la Medicina: Karl Landsteiner (1868-1943): Descubridor de los grupos sanguíneos y pionero de las transfusiones y del estudio de la inmunología. *Galenus*, *77*(4), 46-48.

ELECTRONIC RESOURCES

American Heart Association, High Blood Pressure: https://www.heart.org/en/health-topics/high-blood-pressure

BioDigital Human: https://www.biodigital.com/

Brain & Life: https://www.brainandlife.org/the-magazine/articles/

Diabetes: https://www.diabetes.org/diabetes

Enciclopedia médica de Medline Plus en español: https://medlineplus.gov/spanish/ency/encyclopedia_C.htm

High Blood Pressure: https://www.heart.org/en/health-topics/high-blood-pressure

KenHub: https://www.kenhub.com/

Melanoma: https://www.skincancer.org/skin-cancer-

information/melanoma/melanomawarning-signs-and-images/

Módulo de aprendizaje interactivo sobre el asma:
https://www.lung.org/espanol/asthmabasics-en-espanol

Sleep Science: In the Era of Screens, Rest is Crucial:
https://www.nationalgeographic.com/magazine/2018/08/science-of-sleep/

Sobre el cáncer: https://www.cancer.org/es/cancer.html

Virtual allergist: https://www.aaaai.org/conditions-and-treatments/Virtual-Allergist

Visible Body: https://www.visiblebody.com/en-us/

For more information resources related to the course's topics, access the library's webpage http://biblioteca.sagrado.edu/

REASONABLE ACCOMMODATION

For detailed information on the process and required documentation you should visit the corresponding office. To ensure equal conditions, in compliance with the ADA Act (1990) and the Rehabilitation Act (1973), as amended, any student in need of reasonable accommodation or special assistance must complete the process established by the Vice Presidency for Academic Affairs.

ACADEMIC INTEGRITY

This policy applies to all students enrolled at Universidad del Sagrado Corazón to take courses with or without academic credit. A lack of academic integrity is any act or omission that does not demonstrate the honesty, transparency, and responsibility that should characterize all academic activity. Any student who fails to comply with the Honesty, Fraud, and Plagiarism Policy is exposed to the following sanctions: receive a grade of zero in the evaluation and / or repetition of the assignment in the seminar, a grade of F (*) in the seminar, suspension, or expulsion as established in the Academic Integrity Policy effective in November 2022.