

SAGRADO

Universidad del Sagrado Corazón

SCHOOL OF HEALTH AND SCIENCES

SYLLABUS

TITLE:	Human Biology II
CODE:	BIO 102
PREREQUISITE:	BIO 101
CORREQUISITE:	BIO 102L
CREDITS:	3 credits 30 contact hours 45 lab hours 1 term

DESCRIPTION

This course is the continuation of the study of the systems of the human body (BIO 101). Human Biology II is a theoretical and practical course that emphasizes on the structure and functioning of the organs and systems of the human body. Here you will study the skeletal, muscular, digestive, urinary, and reproductive systems. The latter includes the basics of embryology, pregnancy, childbirth, and breastfeeding. The course also studies the basics of nutrition and stress as an adaptative response. The importance of knowing this is demonstrated by its utility in the clinic and in daily life through the use of images, interactive models, and case management. The course is aimed for undergraduate Nursing, Exercise Science, and Psychology students. Likewise, students from graduate programs who are required to have this knowledge, such as Physical therapy and Speech Pathology programs.

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 a diagram, the structures that form the systems under study.
2. Identify the basic functions, divisions, and classifications of the systems under study, as well as the nutrients, hereditary patterns, and the anatomical connections of stress.
3. Outline the model of muscular contraction and relaxation, the types of joints, the process of digestion, the metabolization of macronutrients, and the phases of the Selye syndrome.
4. Write a glossary of the terms presented by topic.
5. Match the studied structures with their main function, as well as the macronutrients and micronutrients with their source and basic function.
6. Detect the metabolic needs in different scenarios of extraordinary demand, for example: extreme temperature conditions, lack or excess of nutrients.
7. Explain the formation of urine, the menstrual cycle and its developmental stages, and the basic hereditary patterns.
8. Propose a basic explanation to a patient of how to care for each of the systems or issues studied.
9. Analyze the interrelation of the systems and processes studied in the integral functioning of each human being.
10. Integrate the systems of the human body in exercises of everyday life situations or clinical cases.
11. Participate, in teams, in the design of a nutritional and exercise strategic plan for two real people with socioeconomic and health challenges.
12. Create a basic nutritional plan (for one day) for a person with specific socioeconomic challenges.
13. Explore, in a team, the alternatives that people use to manage stress.
14. Execute an accessible and effective stress-management plan based on the science learned.

CONTENTS

- I. Skeletal System
 - A. Definition
 - B. Functions
 - C. Histological types of bones
 - D. Morphological types of bones
 - E. Divisions
 1. Axial
 2. Appendicular
 - F. Differences between the male and female pelvis
 - G. Bone changes due to age: osteopenia and osteoporosis
 - H. Fractures, pathology (tumors)
 - I. Bone nutrition
- II. Joints
 - A. Definitions
 - B. Functions
 - C. Classification
 1. Structural
 2. Functional
 - D. Movements
 - E. Clinical correlations
- III. Muscular System
 - A. Histology and physiology of the muscular system
 1. Three types of muscle tissue
 - a. Smooth
 - b. Skeletal
 - c. Cardiac
 2. Characteristics
 3. Contraction mechanism
 - a. Neurological factors
 - b. Factors that determine the force of contraction
 - B. Anatomy
 1. Anatomical bases for naming muscles

2. Origin, insertion, action, and innervation

a. Trunk

1) Posterior region

2) Anterior region

b. Extremities

1) Upper limbs

2) Lower limbs

c. Clinical correlations

IV. Digestive System

A. Functions

B. Anatomy

1. Histology of the digestive tract

2. Description of the location, structure, and function of the components of the digestive system and accessory organs

C. Physiology

1. Chewing and salivary digestion

2. Deglutition

3. Peristalsis

4. Gastric digestion and absorption

5. Identifying areas of food absorption

D. Elimination

E. Clinical correlations

V. Metabolism and Nutrition

A. Definitions

B. Types of nutrients

1. Names

2. Basic structures

3. Main functions

4. Main sources

C. Macronutrient metabolization

1. Absorption at the intestinal level

2. Storage

3. Regulatory mechanisms

4. Clinical correlations
- D. Micronutrient metabolism
 1. Names
 2. Functions
 3. Main sources
- E. Water metabolism
 1. Water balance
 2. Entry and excretion pathways
- F. Metabolism
 1. Definition: anabolism and catabolism
 2. Definition of basal metabolism
 3. Factors that modify basal metabolism
 - a. Total adult calorie requirement by sex
 - b. Requirement of daily calories from nutrients
- VI. Urinary System
 - A. Functions
 - B. Components
 1. Kidneys
 - a. Location
 - b. Macroscopic anatomy
 - c. Microscopic anatomy
 - d. Physiology of urine formation
 2. Excretory passages (ureters, urinary bladder, and urethra)
 - a. Location
 - b. Structure
 - c. Function
 3. Urine
 - a. Physical characteristics
 - b. Chemical composition
- VII. Reproductive System
 - A. Male
 1. Location, structure, and organ function
 2. Endocrinology

3. Spermatogenesis
4. Sperm histology
5. Semen: composition and formation
6. Sexual act
 - a. Erection
 - b. Ejaculation

B. Female

1. Location, structure, and organ function
2. Structure and function of the mammary glands
3. Endocrinology
4. Menstrual cycle
5. Oogenesis
6. Sexual act
7. Contraceptive methods
8. Menarche and menopause

VIII. Embryology, intrauterine development, childbirth, and lactation

A. Definition

B. Intrauterine or prenatal development

1. Pre-implantation
 - a. Fertilization
 - b. Segmentation stages
 - c. Embryonic layers
2. Embryonic period
 - a. Implantation
 - b. Gastrulation
3. Fetal period
 - a. The placenta
 - b. The umbilical cord
 - c. Maternal-fetal circulation
 - d. The amniotic sac

C. Childbirth and its stages

D. Breastfeeding

1. Colostrum

2. Breastfeeding regulating mechanism

IX. Genetics and Heredity

A. Chromosomes and genes

1. Mechanism of genetic function
2. The human genome
3. Meiosis

B. Heredity

C. Mutations

D. Medical genetics

E. Methods for studying heredity

1. Family tree (pedigree)
2. Karyotype
3. Molecular

F. Treatments for genetic diseases

X. Stress

A. Selye's concept

1. Definition
2. Stressors
3. General adaptation syndrome
4. Stress mechanisms

B. Modern concepts about stress

1. Definition
2. Stress syndrome
3. Stress and illness
4. Corticosteroids and resistance to stress
5. Psychological stress
6. Effects of intrauterine stress

LABORATORY EXPERIENCES

A. Microscope

B. Skeletal system (axial - skull bones)

C. Skeletal system (spine)

D. Skeletal system (appendicular - upper limbs)

- E. Skeletal system (appendicular - lower limbs)
- F. Muscular system (axial - head and neck muscles)
- G. Muscular system (thorax, abdomen, and back)
- H. Muscular system (upper limb muscles)
- I. Muscular system (lower limb muscles)
- J. Digestive and excretory systems
- K. Reproductive system and embryology

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	25%
Partial assignments	25%
Final project or exam	25%
Immersion project	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

Ashwell, K. (2016). *The Student's Anatomy of Stretching Manual*. Quad Books.

Barnes-Svarney, P. (2015). *The Handy Nutrition Answer Book*. Visible Ink Press.

Dow, C. (2019, July). A body in motion: What matters. What's malarkey. *Nutrition Action Healthletter*, 46(6), 9-11.

Kabat-Zinn, J. (1990, 2013). *Full Catastrophe Living*. Random House.

Moyer, L. (2019, September). Raising the Bar: Real food in a wrapper?. *Nutrition Action Healthletter*, 46(7), 13-15.

Moyer, L. (2019, May). State of the Plate: What Americans eat. *Nutrition Action Healthletter*, 46(4), 7.

ELECTRONIC RESOURCES

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

Center for Science in the Public Interest, Nutrition Action Healthletter:
<https://cspinet.org/nutrition-action-healthletter>

American Diabetes Association: <https://www.diabetes.org/diabetes>

Medline Plus medical encyclopedia: https://medlineplus.gov/ency/encyclopedia_C.htm

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

Mindful: <https://www.mindful.org/author/jon-kabat-zinn/>

Shamata Project, University of California at Davis:
<https://mindbrain.ucdavis.edu/research/research-projects-folder/shamatha-project>

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.

All rights reserved | Sagrado | November 2022 | Translated January 2024