

# 26304 - Anatomic, kinesiological and biomechanical basics in physical activity and sport

## Syllabus Information

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**Academic Year:** 2020/21

**Subject:** 26304 - Anatomic, kinesiological and biomechanical basics in physical activity and sport

**Faculty / School:** 229 - Facultad de Ciencias de la Salud y del Deporte

**Degree:** 295 - Degree in Physical Activity and Sports Science

**ECTS:** 12.0

**Year:** 1

**Semester:** Annual

**Subject Type:** Basic Education

**Module:** ---

## 1.General information

### 1.1.Aims of the course

### 1.2.Context and importance of this course in the degree

### 1.3.Recommendations to take this course

## 2.Learning goals

### 2.1.Competences

### 2.2.Learning goals

### 2.3.Importance of learning goals

## 3.Assessment (1st and 2nd call)

### 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

## 4.Methodology, learning tasks, syllabus and resources

### 4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on lectures where the student acquires the basic concepts of the course, which are complemented by practice sessions and seminars where the student interprets and analyzes the concepts acquired. The student will also carry out a practical project to apply the previous knowledge and problem-solving techniques.

### 4.2.Learning tasks

The course includes the following learning tasks:

- Practice sessions and seminars
- Information search
- Lectures where student discussion will be encouraged.
- Group work.

If due to the COVID pandemic students are not able to attend classes. Theoretical and practical contents will be updated through ADD.

### 4.3.Syllabus

The course will address the following topics:

### **First semester**

- SECTION 1. ANATOMY OF THE SYSTEMS
  - Topic 1. General Anatomy. Introduction to Anatomy. Definitions. Axes, planes and basic structural elements.
  - Topic 2. Functionality of the circulatory system
  - Topic 3. Functionality of the respiratory system
  - Topic 4. Functionality of the digestive system
  - Topic 5. Functionality of the urinary system
  - Topic 6. Functionality of the reproductive system
  - Topic 7. Functionality of the endocrine system
  - Topic 8. Functionality of the nervous system
- SECTION 2. ANATOMY OF THE LOCOMOTIVE DEVICE: TRUNK, HEAD AND NECK
  - Topic 9. Skeleton and joints of the vertebral column
  - Topic 10. Skeleton and joints of the thorax
  - Topic 11. Neuromuscular systems of the back
  - Topic 12. Thorax neuromuscular systems
  - Topic 13. Neuromuscular systems of the abdomen
  - Topic 14. Skeleton and joints of the head
  - Topic 15. Head neuromuscular systems
  - Topic 16. Neuromuscular systems of the neck
- SECTION 3. EXTREMITIES
  - Topic 17. Skeleton of the upper extremity
  - Topic 18. Joints of the upper limb
  - Topic 19. Neuromuscular systems of the ulnar and median nerves
  - Topic 20. Neuromuscular systems of the radial and musculocutaneous nerves
  - Topic 21. Neuromuscular systems of the circumflex, coracoid and axilla nerves
  - Topic 22. Skeleton of the lower limb
  - Topic 23. Joints of the lower limb
  - Topic 24. Thigh and buttock neuromuscular systems
  - Topic 25. Neuromuscular systems of the leg and foot
- SECTION 4. STESIOLOGY
  - Topic 26. Functionality of the sense of sight
  - Topic 27. Functionality of the sense of hearing

### **Second semester**

- SECTION I. FOUNDATIONS
  - Topic 1. Introduction to Kinesiology and Biomechanics
  - Topic 2. Linear translation of the bodies: linear kinematics
  - Topic 3. Linear translation of the bodies: linear kinetics
  - Topic 4. Angular movement of bodies: angular kinematics
  - Topic 5 . Angular movement of the bodies: angular kinetics
  - Topic 6. Balance and Stability
  - Topic 7. Work, power and energy
  - Topic 8. Fluid dynamics: the effect of water and air
- SECTION II. PHYSICAL CHARACTERISTICS OF TISSUES
  - Topic 9. Bone biomechanics
  - Topic 10. Biomechanics of joints
  - Topic 11. Muscle Biomechanics
- SECTION III. BIOMECHANICS AND KINESIOLOGY OF BODY JOINTS
  - Topic 12. Shoulder Joint Complex
  - Topic 13. Joint elbow complex
  - Topic 14. Joint and wrist joint complex
  - Topic 15. Joint complex of the hip

- Topic 16. Joint Complex of the Knee
- Topic 17. Ankle and foot joint complex
- Topic 18. Joint complex of the trunk
- SECTION IV. ANALYSIS OF THE MOVEMENT
  - Topic 19. Analysis of the erect posture
  - Topic 20. Analysis of the march
  - Topic 21. Applications of biomechanics to physical activity and sport
  - Topic 22. Sports Material: Biomechanical Aspects of Sports Footwear

#### 4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Health and Sports Sciences website.

#### 4.5. Bibliography and recommended resources

- Kapandji, Ibrahim Adalbert. Fisiología articular : esquemas comentados de mecánica humana. Vol. 3, Tronco y raquis/ A.I. [sic] Kapandji ; versión española de María Torres Lacomba. ed: Médica Panamericana, 2015
- Kapandji, Ibrahim Adalbert. Fisiología articular : esquemas comentados de mecánica humana. Vol. 2, Miembro inferior/ A.I. [sic] Kapandji ; versión española de María Torres Lacomba. ed: Médica Panamericana, 2010
- Kinesiología y anatomía aplicada a la actividad física / por Jarmo Ahonen ... [et al.] ; [traducción, Cristina Halberstadt] . 2a. ed. Barcelona : Paidotribo, cop. 2001
- Dufour, Michel. Biomecánica funcional : miembros, cabeza, tronco : [bases anatómicas, estabilidad, movilidad, tensiones] / Michel Dufour, Michel Pillu ; figuras de Michel Dufour . Barcelona [etc.] : Masson, D.L. 2006
- Viladot Voegeli, Antonio. Lecciones básicas de biomecánica del aparato locomotor / Antonio Viladot Voegeli ; prólogo, D. Ruano Gil . Reimp. Barcelona : Masson, 2004
- Izquierdo Redín, Mikel. Biomecánica y bases neuromusculares de la actividad física y el deporte / Mikel Izquierdo . Madrid [etc.] : Editorial Médica Panamericana, D.L. 2013
- Kapandji, Ibrahim Adalbert. Fisiología articular : esquemas comentados de mecánica humana. Vol. 1, Miembro superior / A.I. [sic] Kapandji ; versión española de María Torres Lacomba . ed: Médica Panamericana, D.L.2009
- Izquierdo Redín, Mikel. Biomecánica y bases neuromusculares de la actividad física y el deporte / Mikel Izquierdo . 1a. ed, 1a. reimp. Madrid [etc.] : Editorial Médica Panamericana, 2013