

Academic Year/course: 2021/22

## 26766 - Physiology III

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 26766 - Physiology III

**Faculty / School:** 104 - Facultad de Medicina

229 - Facultad de Ciencias de la Salud y del Deporte

**Degree:** 304 - Degree in Medicine

305 - Degree in Medicine

**ECTS:** 6.0

**Year:** 2

**Semester:** First semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

## 2. Learning goals

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

## 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 favors the acquisition of knowledge related to Physiology. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, and assignments.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

### 4.2. Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1,6 ECTS): 40 hours.
- Practice sessions (0,72 ECTS): 18 hours.
- Assignments (0,32 ECTS): 8 hours.
- Autonomous work (3,20 ECTS): 80 hours.
- Evaluation (0.16 ECTS): 4 hours.
- In FCCSD,

Given the exceptional situation of the Academic Year 2021-2022, the large group teaching system could be online, that is to say, in a synchronic telematic system, by which teachers and students will be connected through technologies that allow interaction, such as Google Meet.

### 4.3. Syllabus

The course will address the following topics:

#### The cardiovascular system

- 1. Functional properties of the myocardium. The electrical activity of the heart.
- 2. Cardiac cycle: periods. Atrial, ventricular, and arterial pressures. Heart sounds.
- 3. Physiological basis of the electrocardiogram. Waves, vectors and complexes. Normal values, and more frequent abnormalities.
- 4. Cardiac output. Extrinsic and intrinsic cardiac activity control.
- 5. General functions of the circulatory system.
- 6. Biophysics Circulation: Hemodynamics: volume, flow, pressure, and resistance in the circulatory system. Reynolds number. Distensibility and vascular capacitance.
- 7. Biophysics of Circulation: Circulation in arteries and arterioles. Hemodynamics. Hagen-Poiseuille Law. Blood pressures. Periodic phenomena: Pulse wave. Blood viscosity.
- 8. Microcirculation: capillary-Interstitial-lymphoid nodes. Exchange capillary dynamics. Lymphatic circulation. Edema.
- 9. Circulation in the venous system. Venous return. Central venous pressure.
- 10. Regulation of blood flow. Nervous and humoral mechanisms. Role of nitric oxide in the control of blood flow.
- 11. Regulation of blood pressure. Baroreceptors and chemoreceptors. Humoral regulation. Renal regulation.
- 12. Coronary circulation.
- 13. Splanchnic circulation. Muscular circulation.

#### Respiration

- 14. Pulmonary circulation.
- 15. Functional structure of the respiratory system. Functions of the pleura and pleural fluid.
- 16. Respiratory cycle. Respiratory types. Lung volumes and airflow. Alveolar ventilation. Ventilation-perfusion ratio
- 17. Respiratory mechanics. Respiratory muscles. Thoracic pressures.
- 18. Static and dynamic resistance of the respiratory system. Surfactant.
- 19. Gas exchange through the respiratory membrane
- 20. Blood gas transport
- 21. Control of breathing

#### The gastrointestinal system

- 22. Structural features of the gastrointestinal system and its accessory structures
- 23. Neural and hormonal mechanisms in the gastrointestinal system
- 24. Motility in the gastrointestinal system
- 25. Salivary secretion and digestion
- 26. Gastric secretion and digestion
- 27. Exocrine pancreatic secretion and digestion
- 28. Biliary secretion
- 29. Intestinal secretion and digestion
- 30. Intestinal absorption. Faeces

#### Practical program (Faculty of Medicine)

1. Cardiovascular adaptation to exercise (seminar)
2. Cardiovascular, respiratory and digestive aging (seminar)
3. Respiratory adaptation to exercise (seminar)
4. Physiological adaptation to altitude (seminar)
5. Registration and interpretation of the electrocardiogram (Lab/ABP)
6. Cardiac, pulmonary and abdominal auscultation (Lab/ABP)
7. Cardiac ultrasound (Lab/ABP)
8. Arterial pressure and pulse rate (Lab/ABP)
9. Spirometry (Lab/ABP)
10. Acid-base balance (Lab/ABP)
11. Digestion (simulation)

#### Practical program (Faculty of Health and Sport Sciences)

- Electrocardiogram I-Record (Lab / ABP)
- Electrocardiogram II-Interpretation (Lab / ABP)
- Pressure and arterial pulses (Lab / ABP)
- Cardiac and pulmonary auscultation
- Spirometry (Lab / Simulation)
- Cardiovascular and respiratory adaptation to effort (Lab / ABP)
- Digestion (Simulation)
- Seminar on the cardiovascular system (Part I)
- Seminar on the cardiovascular system (Part II)
- Respiratory system seminar
- Seminar acid-base balance
- Digestive system seminar

#### **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 "Facultad de Medicina" website and the Degree website (<http://medicina.unizar.es>, <http://moodle2.unizar.es>)

Huesca Degree website: <https://fccsyd.unizar.es/horarios-y-calendarios-medicina>

#### **4.5. Bibliography and recommended resources**

The updated bibliography of the subject is consulted through the library web page:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26766>