

TEACHING PLAN FOR

Introduction to Health Sciences

1. Basic description

Name of the course: Introduction to Health Sciences

Academic year: 2016-2017

Year: 2017

Term: First

Degree / Course: First

Code: 51311

Number of credits: 4 ECTS

Total number of hours committed: Complete

Teaching language: English

**Lecturer: Ana Martín, Sandra Montagud, Olga Valverde, Vincent Warnault,
Laura Serra, Sergio Vargas-Prada**

Timetable: See official calendar

2. Presentation of the course

The present course is an introduction to the health sciences field in order to understand the complexities of the cells, tissues, and major organs and systems of the human body. The aim of this course is to acquire a basic understanding of the physiological mechanisms that allow for the running of each major organ systems. Topics include basic immunity, cardiovascular, respiratory, digestive, endocrine, reproduction and nervous system characteristics and functions.

3. Competences to be worked in the course

I. General competences

BC1. That the students demonstrate to have acquired the knowledge and understanding in the field of the study that starts from the basis of general secondary education, and is typically at a level that although it is supported by advances textbooks, includes some aspects that involve knowledge of the forefront of their field of study

BC2. That the students have the ability to gather and interpret relevant data to make judgements that include reflection on relevant social, scientific or ethical subjects.

BC3. That the students can convey information, ideas, problems and solutions to both specialist and non-specialist audiences.

BC4. That the students have developed those skills needed to undertake further studies with a high degree of autonomy.

II. Specific competences

SC1. To demonstrate knowledge, skills and appropriate practices in the area of the human anatomy and physiology.

SC2. To identify meaningful and reliable sources of scientific information to substantiate the state of arts of a physiological problem and to address its resolution.

SC3.-To provide students with the capacity to adapt to dynamic teams and environments and to take complex decisions regarding their professional activity.

SC4.- To apply statistical and computational methods to solve problems in the field of physiology and medical research.

SC5 - To know the main techniques of epidemiological investigation.

SC6 - To integrate the bioinformatics tools that the student receive during their professional career with classic epidemiologic methods.

Learning outcomes

- To know the most relevant information about anatomy and physiology for humans. To understand the functions of the body and the relationships between the body parts. To have a global understanding about the integrative function of the central nervous system.
- To know valid sources of scientific information to support the state of the arts of a physiological problem.
- To use specific search tools and resources from databases and information related to biomedicine.
- Describe the utility and applicability of epidemiology in the research process.
- Understand, calculate and interpret measures of frequency, association and impact.
- Define the basic designs of epidemiological research.
- Know the meaning and types of research bias and how they influence the research process
- Differentiate the concepts of confounding and interaction.
- Interpret results from epidemiological studies.
- Promote critical reading of scientific articles.

4. Contents

This subject will have two different parts:

1. Introduction to Human Physiology

Talks and seminars given by experts in different aspects of health sciences. In particular, general aspects of human physiology, including different peripheral organs and systems and the study of the central nervous system. Integration of the physiological information as well as to reinforce the interest of the students in the use of bioinformatics applications as a necessary tool to approach complex biological and physiological process.

1.- The organization and basic functions of human body. Homeostasis: a framework for human physiology.

2.- Blood and immune system. The blood cells. Cells and secretion mediating immune defences. Innate immune responses. Adaptive immune responses. Harmful immune responses.

3.- The cardiovascular and the respiratory systems. Overview of the circulatory system. Anatomy and physiology of the heart. The electrocardiogram. Mechanical events of the cardiac cycle. Organization of the respiratory system. Exchange of gases in alveoli and tissues. Transport of oxygen in blood.

4.- The gastrointestinal system. The digestion and absorption of food. Overview of the digestive system. General functions of the gastrointestinal organs. How are gastrointestinal processes regulated?

5.- Basic principles of renal physiology. Structure of the kidneys and urinary system. Basic renal processes.

6.- The endocrine system. General characteristics of the hormones and hormones control system. Steroid hormones. Control systems involving the hypothalamus and pituitary gland. The endocrine response to stress. The thyroid gland. Hormonal influence on growth.

7.- The reproductive system. Gametogenesis. Sex determination and sex differentiation. Reproductive endocrinology. Spermatogenesis. Hormonal control of male reproductive functions. Female reproductive physiology. Pregnancy. Hormonal changes during pregnancy.

8.- The nervous system. Synapses and functional anatomy of synapses. Mechanisms of neurotransmission release. Main neurotransmitter and neuromodulator systems. Structure of the nervous system and broad functions of the major structures of the central and peripheral nervous systems. Concept of blood brain barrier. State of consciousness. Sleep. The brain and behaviour: motivation and emotions. Learning and memory processes.

Responsible: Olga Valverde

2. Introduction to Epidemiology

Considering that diseases are multifactorial events influenced by biological and social determinants, the learning objectives of the 'Introduction to Epidemiology' course will allow bioinformatics students to integrate the bioinformatics tools that they receive during their professional career with classic epidemiologic methods, in order to achieve a complete characterization and assessment of diseases and their risks. Theoretical session, in-class activities and seminars will be given:

1. Definition of epidemiology. Research question, hypothesis and aims.
2. Measures of frequencies: theory and in-class activities. Seminar 1 (groups): Measures of frequencies.
3. Measures of association: theory and in-class activities. Seminar 2 (groups): Measures of association and impact
4. Measures of impact: theory and in-class activities. Seminar 2 (groups): Measures of association and impact.
5. Basic designs in epidemiological studies and their applicability: theory and in-class activities. Seminar 3 (groups): Basic designs in epidemiological studies and random and systematic errors.
6. Random and systematic errors and their influence in the research process: theory and in-class activities. Seminar 3 (groups): Basic designs in epidemiological studies and random and systematic errors.
7. Confounding and interaction: definition, characteristics and differences. Stratified analysis: theory and in-class activities. Seminar 4 (groups): Confounding and interaction
8. Seminar 5 (groups): All topics included.

Responsible: Sergio Vargas-Prada, Laura Serra

5. Assessment

Introduction to Human Physiology

Part I.

- After each plenary session, each student will do a short abstract (1000 characters max) that will deliver within next two weeks. This abstract must summarize the main points of the plenary session.
- Participation in the seminars and deliver the completed seminar dossier explaining the question asked.
- Exam with shorts questions about the key points of the matter.

Part II.

Assessment elements	Time period	Type of assessment		Assessment agent			Type of activity	Grouping		Weight (%)
		Comp	Opt	Lecturer	Self-assess	Co-assess		Indiv	Group (#)	
Delivery of abstracts Part I.	One or two per weeks	X		X			Conceptual	x		10%
Delivery of seminar dossier Part I	Weeks 4 and 5	X		X			Conceptual and synthesis	X		10%
Evaluation Part I	Exam schedule	X		X			Synthesis	X		30%

Working competences and assessment of learning outcomes:

	BC1	BC2	BC3	BC4	SC1	SC2	SC3	SC4										Learning outcomes
Delivery of abstracts Part I	X	X	X	X	X	X	X	X										
Delivery of seminars Part I	X	X	X	X	X	X	X	X										
Evaluation Part I	X	X	X	X	X	X	X	X										

Introduction to Epidemiology

The evaluation will be carried out on an ongoing basis and through participation in theoretical sessions and in the activities that students will have to develop in the seminars; therefore, there will not be a final exam. This means that the evaluation will have an individual and a group component.

The evaluation criteria will be 1) attendance to class and active participation in the theoretical sessions and seminars will have a value of 30% of the final score, and 2) the deliverables per group developed during the seminars will be the remaining 70%. In this second criterion the structure and content of the deliverable will be evaluated.

All seminar activities will be worked in class. The groups will have to submit a document with the activities developed during the seminar at the end of the seminar.

6. Bibliography and teaching resources

- Basic bibliography
 - EP Widmaier, H. Raff and KT Strang (2011) Vander's Human Physiology, McGraw Hill.
 - G Pocock, CD. Richards, D Richards. (2013). Human Physiology. Oxford.
 - Artyhur C. Guyton and John E. Hall. (2006). Medical Physiology. Elsevier.
 - Porta M (ed). A Dictionary of Epidemiology. 6th ed. Oxford: Oxford University Press; 2014.
 - Szklo M, Nieto FJ. Epidemiology, beyond the basics. 3th ed. Sudbury, Mass: Jones and Bartlett; 2014
 - Rothman KJ. Epidemiology: An Introduction. 2th ed. Oxford: Oxford University Press; 2012.
 - Gordis L. Epidemiology. 5th ed. Philadelphia : Elsevier; 2009.
- Teaching resources
 - Lecture notes: slides will be made available before the classes (part I - Introduction to Human Physiology).
 - Notes and tutorial for seminar sessions (part I- Introduction to Human Physiology).

7. Methodology

Introduction to Human Physiology

Part I.

- a) Plenary lessons
- b) Seminar sessions

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- a) Theory sessions and in-class activities
- b) Seminar sessions

8. Scheduling activities

Introduction to Human Physiology

Week	Activity in the classroom Grouping/type of activity	Activity outside the classroom Grouping/type of activity
Week 1 : 03/04	Objectives of the courses. Class dynamics. 1.- The organization and basic functions of human body. 2.- Blood and immune system. T: 4 hours	
Week 2: 17/04	3.- The cardiovascular and the respiratory systems. 4.- The gastrointestinal system. 5.- Basic principles of renal physiology T: 4 hours	
Week 3: 24/04	6.-The endocrine system. 7.-The reproductive system. T: 4 hours	
Week 4: 01/05	8.- The nervous system I. Seminar 1. T: 2 hours S (101) 2 hours S (102) 2 hours	
Week 5: 08/05	8.- The nervous system II Seminar 2. T: 2 hours S (101) 2 hours S (102) 2 hours	
Week 6	T: 4 hours S (101) 3 hours S (102) 3 hours	
Week 7	T: 3 hours	
Week 8	T: 1 30 hours S (101) 1 30 hours S (102) 1 30 hours	
Week 9	S (101) 3 hours S (102) 3 hours	
Week final exams		

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Session 1 1.5 h 16/05/2017	Definition of epidemiology. Research question, hypothesis and aims. Measures of frequencies: theory and in-class activities	Sergio Vargas-Prada
Session 2 1.5 h 18/05/2017	Measures of association and measures of impact: theory and in-class activities	Laura Serra
Session 3 1.5 h 23/05/2017	Seminar 1 (groups): Measures of frequencies	Laura Serra
Session 4 1.5 h 25/05/2017	Seminar 2 (groups): Measures of association and impact	Laura Serra
Session 5 1.5 h 30/05/2017	Basic designs in epidemiological studies and their applicability: theory and in-class activities: theory and in-class activities	Sergio Vargas-Prada
Session 6 1.5 h 01/06/2017	Random and systematic errors and their influence in the research process: theory and in-class activities	Sergio Vargas-Prada
Session 7 1.5 h 06/06/2017	Seminar 3 (groups): Basic designs in epidemiological studies and random and systematic errors	Sergio Vargas-Prada
Session 8 1.5 h 08/06/2017	Confounding and interaction: definition, characteristics and differences. Stratified analysis: theory and in-class activities	Laura Serra
Session 9 1.5 h 13/06/2017	Seminar 4 (groups): Confounding and interaction	Laura Serra
Session 10 1.5 h 15/06/2017	Seminar 5 (groups): All topics	Laura Serra / Sergio Vargas-Prada