UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Comparative Anatomy

2425-1-E1301Q086-E1301Q095M

Aims

The course is divided into two modules: **Cytology and Histology** (first module) and **Comparative Anatomy** (second module).

The **comparative anatomy module** is divided into two parts. The first part will provide the student with the basic concepts related to the phases that regulate the development of Vertebrates (from fertilization to organogenesis), concepts that will allow them to understand the embryological derivation of organs, systems, knowledge necessary for anatomy. The content of the anatomy will provide the student with notions related to the anatomy of Vertebrates in a functional and evolutionary key. The theoretical concepts provided in the classroom will be followed by the laboratory experience.

1. Knowledge and understanding
At the end of the course, the student will acquire knowledge about the animal eukaryotic cell and the organelles that characterize it in morpho-functional terms and the organization of the tissues. Furthermore, the student will know the organization of organs, systems from a morpho-functional and comparative point of view and will be able to recognize the histo-anatomical preparations.

2. Applying knowledge and understanding
At the end of the course the student will be able to apply the knowledge acquired in point 1 to the subsequent subjects he will study in the following years.

3. Making judgements
The student must be able to critically process the acquired knowledge and choose the most appropriate approach to link the morpho-functional characteristics of the animal eukaryotic cell to more complex organization levels such as tissues, organs and systems.

4. Comunication skills
At the end of the course, the student will be able to describe, with an appropriate scientific language, the cell organization and arrive, through the description of tissues and organs, to the systems.

5. Learning skills
At the end of the course, the student will have the skills to face the subsequent studies that require basic knowledge of cytology, histology and anatomy.
Furthermore, the student will be able to associate the knowledge learned with the concepts that he will assimilate in the subsequent studies that require cyto-isto-anatomical knowledge as prerequisites.

Contents

Comparative Anatomy Module: after an introduction to embryology, the study of the anatomical organization of Vertebrates will be addressed, considering the functional and evolutionary aspects. The lectures will be accompanied by the mandatory laboratory activity to observe histo-anatomical samples under the microscope

Detailed program

Comparative Anatomy
- General principles of embryology. From the zygote to the embryo: segmentation; gastrulation; organogenesis.
- Classification and main characteristics of the various classes of Vertebrates and their progressive evolution.
- Hierarchical organization: cell-tissues-organs-apparatuses / systems-organism.
- Tegumentary apparatus: functional and structural aspects. The tegument and derivatives in Vertebrates. Skin pigmentation.
- Digestive apparatus: general characteristics of the digestive tract in Vertebrates, microscopic aspects and function of the different sections of the digestive tract (esophagus, stomach, intestine). Liver and pancreas: morphology, function and relationship with the digestive apparatus.
- Respiratory apparatus: general characteristics in Vertebrates (gills and lungs) and its evolution in tetrapods.
- Uro-genital apparatus: anatomy and evolution of the excretory apparatus in Vertebrates. The functional unit of the kidney: microscopic aspects. Structural aspects of the testis (cystic and tubular) and of the ovary (sacciform and parenchymatous).

Laboratory: Comparative Anatomy
Microscopic observation of histo-anatomical preparations related to the topics addressed in class. A comparative analysis will be performed.

Prerequisites

Basic knowledges of Biology and Histology

Teaching form

Teaching language: Italian

Second semester - module of Anatomy:
20 x 2-hour lessons composed by:

- a section of **delivered didactics** (Didattica erogativa, DE) focused on the presentation, illustration of

contents, concepts and basic principles of Cytology;
-a section of **interactive teaching** (Didattica Interattiva, DI) which includes supplementary teaching interventions, additional demonstrations relating to the notions presented and discussion with the students
The teaching activities are delivered through **frontal lessons**

Laboratory: 10 hours obligatory divided into 5 activities (each lasting 2 hours) carried out in interactive mode (interactive teaching, DI) 10 hours of laboratory divided into 5 activities (each lasting 2 hours) carried out in interactive mode) 10 hours of laboratory divided into 5 activities (each lasting 2 hours) carried out in interactive mode. This activity is aimed at studying biological tissues. The activity involves the use of the optical microscope for the observation of histo-anatomical samples

The module of Comparative Anatomy is supported by **20 hours of tutoring activities** distributed throughout the academic year to support students throughout their studies in preparation for the exam provided by **interactive teaching** (Interactive Teaching, DI) through in-person tutorials

Textbook and teaching resource

In general, any University textbook of Comparative Anatomy is suitable. The student can choose one of the following texts:

Comparative Anatomy
Comparative Anatomy Manual. E. Giavini, E. Menegola. Published by EdiSes
Histology text used in the previous semester.

On the e-learning page of the course, it will be possible to find:

-Copy of the slides used in classroom and in the laboratory;
-Didactic material (films, cards) made available by Pearson publishng house for in-depth analysis of the Cytology topics covered in class
-Self-assessment quizzes made available by Zanichelli publishng house for the Cytology topics covered in classroom
-useful links where the student can find histo-anatomical images.

Semester

Cytology and Histology: first semester

Comparative Anatomy: second semester

Assessment method

There are no tests in progress.
Written and oral test.
Since the course is divided into two modules, there is a **written test for the Cytology and Histology module** and a **written test for the Comparative Anatomy module**.
Once the written test of the Cytology and Histology module has been passed, the student can access the written

test of Comparative Anatomy.
Both written tests will take place in the calculation room (Moodle platform) with a closed-answer test (true/false, multiple choice, single answer).
The score of the two written tests allows admission to the oral exam and does not average the oral exam mark.

The two written tests will be followed by the oral test, which covers all the topics of the course.

Written test of the Cytology and Histology module (assessment object and criteria): the student's knowledge of the topics covered in classroom and her ability to recognize histological samples are evaluated.

Written test of the Comparative Anatomy module (assessment object and criteria): the student's knowledge of the topics covered in classroom is evaluated.

Oral exam (assessment object and criteria): the aim is to verify the knowledge of the contents related to Cytology, Histology and Comparative Anatomy. The student must demonstrate that he has understood the topics covered and that he has acquired an adequate scientific language to describe the different levels of biological organization (from the cell to the tissue to the organs up to the organism). You must also be able to recognize and describe histo-anatomical images with linguistic properties, critically re-elaborating the acquired concepts.

Office hours

Appointment request by e-mail to: anita.colombo@unimib.it

Sustainable Development Goals

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