GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2022-2023

Vertebrates: Histology and Comparative Anatomy (C000756)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*

Credits 5.0 **Study time 140 h** **Contact hrs** 65.0 h

Course offerings and teaching methods in academic year 2022-2023

B (semester 2)	Dutch	Gent	practicum	40.0 h
			lecture	27.5 h
			online lecture	0.0 h

Lecturers in academic year 2022-2023

Adriaens, Dominique	WE11	lecturer-in-charge

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Bachelor of Science in Biology	5	B
Preparatory Course Master of Science in Biology	5	B

Teaching languages

Dutch

Keywords

Vertebrates, histology, comparative anatomy, evolution.

Position of the course

Provide a basic understanding of the anatomy of the body plan in vertebrates, at the level of tissues, organs and systems. An overview of these structures is provided for the major groups of vertebrates, and this from an evolutionary point of view.

Contents

In the first part, an overview is given of the different types of vertebrate tissues, like epithelia, connective tissues, blood, muscle tissue and nervous tissue. The course focuses on the structure, with typical features, and diversity of these tissues, as well as their major function. Topics that are dealt with are: epithelia (with specializations of the cell membrane), glandular tissues (exocrine, endocrine), structural fibers in the extracellular matrix of connective tissues, cartilage, ossification process and bone tissue, blood cells, blood types, coagulation of blood, functioning of the immune system (T- and B-lymfocytes, MHC-complex), lymphoid organs, allergies, sliding theory explaining muscle contraction, contraction of the heart, neurons and neuroglia cells, synapses, nerve impulse and signal transduction in neurons.

The second part deals with the comparative anatomy of the major groups of vertebrates (agnathans, fishes, tetrapods, amniotes), with emphasis on: the integument, the musculo-skeletal system, the nervous system, digestive system, circulatory system, urogenital system and endocrine system. Both the basic structure and their function are discussed from an evolutionary point of view. Topics that are focused on are e.g. differentiations of the integument, axial and appendicular system (neurocranium, splanchnocranium, transition of agnathans to Gnathostomata, formation of limbs, types of vertebrae), central and peripheral nervous system, sensory organs (nociceptors, olfaction, taste, acustico-lateralis system, vision), animal vs autonomous nervous system, evolution of the pallia in the telencephalon, differentiation of the pharynx (gills, longs, swimbladder), stomach in mammals, digestive tract,

digestive glands, portal systems, evolution of the heart and the major vessels, lymphatic system, osmoregulation, evolution of the renal system, formation and structure of the gonads, orgasm, hormone specificity, endocrine glands and their function, menstruation cycle, hormonal regulation of birth.

Both these parts are dealt with during the practical courses, by means of performing and studying dissections and histological sections. The following practical classes are given: (1) dissection of lamprey (agnathans), shark (chondrichthyans), herring (osteichthyans), pigeon (birds), and rat (mammals); (2) histology of epithelia, muscle tissues, connective tissues, nervous tissue, blood, and gametogenesis; and (3) studying skulls.

Initial competences

This course builds further on the competences acquired during the course "Biodiversity of Vertebrates" (Ba2, 1st semester).

Final competences

1 Students have a good knowledge of terminologies associated with basic anatomy of vertebrates.
2 The students understand and know the basic structure, function and evolution of vertebrate tissues, organs and systems in Vertebrates.
3 The students understand the evolutionary relationships between those structures in the major vertebrate lineages.
4 Students study and can recognize the organization of the vertebrate body plan.
5 Students autonomously and in groups of two perform dissections and recognize all major organs, and situate their interconnection within the system they belong to.
6 Students recognize the major tissue types by means of histological sections (using light microscopes).
7 Students discuss in groups the most important findings of the dissections performed and histological sections studied.
8 Students make use of an English textbook to assimilate and integrate new information on comparative anatomy.
9 The obtained knowledge provides them with the competence to project this onto the human anatomy, and towards an attitude to apply this knowledge with respect to human health, as well as to communicate about it in a comprehensible language.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum, online lecture

Extra information on the teaching methods

Theory: oral classes (notes can be consulted on the internet - https://ufora.ugent.be).
Exercises: dissection and microscopy practical classes (anatomy and histology, resp.), under supervision (notes and web lectures can be consulted on the internet), in groups of two students (with a system of shifting). Students are also allowed to consult the collection of comparative anatomy at the Zoology Museum (www.zoologymuseum.ugent.be).
In the case of COVID19, the practical implementation of the didactic methods may change if the necessity is imposed upon.

Learning materials and price

Syllabus available for the 'Histology' part. For the 'Comparative anatomy' part, a textbook is used (Kardong, 2014). The lecture slides for both parts are accessible through Ufora and are available in bound form (published by Academia Press - www.academiapress.be - cost about €20). Practical notes are available (about €12 and €5, resp.). Lecture slides (ppt) and web lectures are available through Ufora. Estimated total cost: €100.

References

Histology: a text and atlas - Ross & Pawlina (2019, 8e editie) - ISBN 978-1975115364, price± 60€
Comparative Anatomy of Vertebrates - Kardong (8th edition, 2018, ISBN 9781260092042) price ± 130€ (cheaper prices for 6th editions available through Amazon or other).

Course content-related study coaching

At the end of the theoretical classes, one or more classes can be included on request by the students, during which questions and problems can be dealt with. Also during the practical courses, questions can be handled, as well as after making an appointment. All notes and syllabi that are used during the lectures, can be found on the internet.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, oral examination

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions, oral examination

Examination methods in case of permanent evaluation

Written examination, oral examination, skills test

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Periodic evaluation:

Theory: open questions, that are answered written and orally (with written preparation), as well as some given terminologies that are to be explained briefly and statements that need to be argued (whether wrong or right). During this evaluation, the knowledge on the anatomy, functioning, cohesion and evolution of the tissues and organ systems is evaluated.

Non-periodic evaluation:

Evaluation of year practicals: in the practicals during of the year (9 in total), the competences with respect to dissecting, microscopy and scientific observing and illustrating are evaluated, and are orally tested for insight and knowledge in the anatomy and histology of the studied animals. These practicals can not be repeated during the second exam period.

Evaluation of practical exam: at the end of the practicals series, each student is evaluated individually by having to perform a dissection and being able to indicate and discuss the observed structures, as well as to discuss microscopic slides. This is done both in a written form and orally (the latter after a preparation time). The examination of the practicals can be redone during the second exam period.

In the case of COVID19, the practical implementation of the evaluation methods may change if the necessity is imposed upon.

Calculation of the examination mark

The final total score is based on the below mentioned score-items, but which can deviate from that with a maximum of 2 points (on 20) in the case an insufficient score is obtained from one of the parts.

Periodical evaluation: based on the lectures (4/6 of the total score).

Non-periodical evaluation practicals during the year form 1/6 of the total score and the exam of the practicals also 1/6 of the total score. Scores of the non-periodic evaluation (practicals during the year) are transferred to the second exam period. When not having passed the practicals examination, this examination has to be done again in the second exam period.

Students who are legitimately absent on certain days of the practical need to make up the relevant exercises at a different time. In case of unjustified absence during the practicals, the total maximum score (theory + practical exercises) will be reduced to the highest non-deliberative quotation (7/20), irrespective of the score for the theoretical part.