

Course size (nominal values; actual values may depend on programme)
 Credits 5.0 Study time 150 h Contact hrs 54.0 h

Course offerings and teaching methods in academic year 2018-2019

Offering	Language	Teaching Method	Hours
A (semester 1)	Dutch	seminar: coached	7.5 h
		exercises	
		lecture	30.0 h
		practicum	16.25 h

Lecturers in academic year 2018-2019

Braeckman, Bart WE11 lecturer-in-charge

Offered in the following programmes in 2018-2019

Programme	crdts	offering
Bachelor of Science in Biology	5	A
Preparatory Course Master of Science in Biology	5	A

Teaching languages

Dutch

Keywords

System physiology, comparative animal physiology, physiological diversity

Position of the course

This course introduces the student to the field of animal physiology. By means of some basic principals of chemistry, physics, morphology and anatomy (taught in these respective courses and briefly brushed up here), it is explained how animals function.

Contents

A concise overview will be given of the physiological answers to the basic requirements of survival. In logical order the gastrointestinal system, respiratory system, transport system, metabolism, excretion and osmoregulation, as well as the nervous and endocrine systems will be discussed. During evolution, several physiological variants of these systems have been developed. The most significant of these will be compared.

Introduction

- Fundamentals of Physiology

Gastrointestinal system

- The major food components
- Food intake
- Digestion and absorption
- Regulation of digestion and time-dependent changes

Respiration

- Respiration strategies
- Ventilation and gas exchange

Transport

- Circulatory systems
- The heart
- Circulation: arteries, veins, capillaries
- Blood composition and function
- Gas transport (O₂, CO₂)

Metabolism

- Why animals need energy.
- Metabolic rate
- Aerobic and anaerobic metabolism
- Aerobic energetics

Excretion and osmoregulation

- water and ion balance
 - Structure and function of the kidney
 - Diversity of excretory systems
- Introduction to neurophysiology
- Neurons, membrane potentials and synapses
 - Organization and evolution of the nervous system
 - Functional organization of the vertebrate nervous system

- Autonomic nervous system
- Motor nervous system (short)
- Sensory nervous system (photoreception, mechanoreception, chemoreception, electroreception)

Introduction to endocrinology

- Hypothalamic-pituitary system
- Endocrine control of food metabolism
- Endocrine control of salt and water balances
- The distance continuum of chemical signals
- Insect hormones

Practical classes

- Digestion: specific amylase activity of the gastrointestinal tract of the cockroach and the pigeon.
- Transport: hemolymph volume of the cricket
- Respiration and transport: human cardiorespiratory contion
- Energy metabolism: microcalorimetry
- Excretion: malpighian tubes of the cricket

Initial competences

Succesfull completion of Cell Biology, Biochemistry, Physics, Organic chemistry or having obtained the competences stated in these courses in another way.

Final competences

- 1 Acquiring knowledge of the scientific terminology as it is used in the field of Animal Physiology.
- 2 Understanding fundamental physiological processes that occur in various organ systems and organisms.
- 3 Acquirement of a spatial and dynamic view of the integrative organ functioning (which is necessary to maintain homeostasis under varying external conditions).
- 4 Ability of critical and scientific reasoning.
- 5 Understanding how experiments can lead to hypotheses and how to verify these.
- 6 Ability to conduct simple experiments and analyse, interpret and report on the obtained data.

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, seminar: coached exercises

Extra information on the teaching methods

Periodical evaluation (80%) + non-periodical evaluation (20%).

Marks of the practicals, obtained in the first exam session are transferred to the second exam session in case of a retake exam.

Tutorials

During the tutorials the student is introduced to basic practical work in a physiology lab (complex solutions, pipeting, spectrophotometry, and necessary calculations)

Learning materials and price

Syllabus Cost: 30 EUR

References

Animal Physiology: from genes to organisms (Sherwood, Klandorf, Yancey) Thomson Brooks Cole, 2005.

Animal Physiology (Hill, Wyse, Anderson) Sinauer, 2004.

Principles of Animal Physiology (Moyes, Schulte) Pearson Benjamin Cummings, 2006

Course content-related study coaching

During as well as after classes, students are given the opportunity to ask questions.

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

Skills test, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Theory: oral with written preparation

Excercises: permanent evaluation during practical exercises and reports

Calculation of the examination mark

Periodical evaluation (80%) + non-periodical evaluation (20%).

The marks for the non-periodical evaluation are again taken into account in the second examination period.