

# Course Specifications

From the academic year 2017-2018 up to and including the

## Physiological Regulation in Animals (C003352)

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

Credits 5.0 Study time 135 h Contact hrs 40.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	excursion	8.75 h
		microteaching	2.5 h
		lecture	30.0 h

Lecturers in academic year 2018-2019

Braeckman, Bart	WE11	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	crdts	offering
<a href="#">Master of Science in Biology</a>	5	A
<a href="#">Exchange Programme in Biology (master's level)</a>	5	A

Teaching languages

English

Keywords

Homeostasis, nervous system, endocrinology, regulatory pathways

Position of the course

Adopting the knowledge acquired in 'introductory animal physiology' and the molecular background from the cell biology course, students should gain deeper insight in the interactions between various systems, at the cellular as well as the molecular level. Students need to master the regulation systems governed by the nervous system, the endocrine system, or both. They should be able to apply this knowledge integratively to a living organism.

Contents

In this course we focus on regulating systems. The physiological regulation maintaining organismal homeostasis is discussed at the cellular and molecular level. The most significant regulating systems are the nervous and endocrine systems.

- 1 Celphysiology of electrically stimulated cells
  - Basics of neurology
  - Molecular transport through the membrane
  - Stimulus and excitability
  - Synaps transmission
  - Neurotransmitters and their receptors (+ pharmacology)
- 2 The sensory nervous system
  - Introduction
  - Pain and other skin and visceral sensations
- 3 Vision
  - The retina
  - The receptor cells
  - Imaging in the retina
  - The connection between eyes and brain
  - The primary visual cortex
  - The visual association cortex (perception of form, color and movement)
- 4 Motoric nervous system
  - Muscles
  - Reflex arcs
  - Types of reflexes
  - Control of posture and movement
- 5 Regulation of visceral functions

- Sympathic system
  - Parasympatic system
  - Enteric system
  - Neurotransmitters
  - Control of autonomic functions (thermoregulation, instinctive behavior and emotions)
- 6 Waking, sleep and the electrical activity of the brain
    - Regulation of wake and sleep
    - Levels of consciousness and sleep
  - 7 Higher functions of the brain
    - Methods of investigation
    - Learning and memory
    - Cerebral dominance and language
  - 8 Communication in non-excitatory cells
    - Introduction
    - Membrane-permeable messengers
    - Membrane receptors
    - Introduction to endocrine regulation
  - 9 The pancreas
    - Insulin
    - Glucagon
    - Somatostatin and pancreaspolypeptide
  - 10 The hypothalamo-pituitary system
    - The hypothalamus
    - The posterior lobe
    - The anterior lobe
    - Pituitary insufficiency
  - 11 The thyroid gland
    - Anatomy and function
    - Synthesis and secretion of thyroid hormones
    - Regulation of thyroid activity
    - Transport and metabolism of thyroid hormones
    - Effects of thyroid hormones
  - 12 The adrenal gland
    - Anatomy of the adrenal gland
    - The medullar hormones
    - The cortical hormones
  - 13 Endocrinology of the reproductive system
    - Sexual differentiation from a common ancestor
    - Common aspects of gonad function
    - Age-dependent changes in gonadotropin secretion
    - The testes
    - The ovaria
    - The hormonal pattern during the menstrual cycle
    - Hormonal regulation of oogenesis

#### Tutorials

The student presents a pitch talk on a relevant publication in the field of neurophysiology or endocrinology.

Excursions to several neurophysiological and/or endocrinological labs are organised.

#### Initial competences

The student successfully followed the courses Cell Biology, Biochemistry and Introductory Physiology

#### Final competences

- 1 Understands the relation between the function and anatomy of the nervous system.
- 2 Being able to describe basic neurophysiological phenomena.
- 3 Understanding the integration of neuronal and endocrine signals.
- 4 Being able to describe endocrine signalling at multiple levels of organization.
- 5 Explaining everyday situations and actions from a physiological point of view.
- 6 Being able to synthesize and communicate scientific literature in the field of physiological regulation.

#### 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

Excursion, lecture, microteaching

## Learning materials and price

Syllabus Cost: 24 EUR

## References

Physiology (Berne and Levy), Mosby, 1998

Review of Medical Physiology, 21st ed (W.F. Ganong), Mc Graw Hill, 2003

Physiology of Behavior (N.R. Carlson), Allyn and Bacon, 1998

## Course content-related study coaching

Questions can be raised during college or electronically via the Minerva forum.

## Evaluation methods

end-of-term evaluation

## 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

Assignment, report

## Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

## Extra information on the examination methods

Oral exam with written preparation

## 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.