Major

**Competence Biomedical Expert**

Fac. Health, Medicine and Life Sciences

**The LEGO Bricks of Life**

**Full course description**

This course focuses on the question how biomolecules impact biology as a whole, up to the level of populations and processes as complex as evolution. The course starts with the study of the structures and functions of major biomolecules (nucleic acids, proteins, fats and sugars), and how these form the building bricks for organelles, cells, organs, and organisms. Special emphasis is placed on natural changes in DNA sequences that subsequently alter protein structure and function, and thereby affect the proper function of cells, organs, organisms and populations.

**Course objectives**

**Intended Learning Outcomes (ILOs)**

- ILO1 Define different forms of life
- ILO2 Explain evolutionary mechanisms of random events and selection pressure and their effects on protein evolution
- ILO3 Describe the macromolecules of life (nucleic acid, proteins, fats and sugars) and explain how their structure relates to their function
- ILO4 Explain how organelles (Golgi apparatus, mitochondria) contribute to cell homeostasis (structure-function relationships)
- ILO5 Demonstrate why the effects of random events may have a bigger impact in a bacterium than in a eukaryotic cell
- ILO6 Explain cellular communication and its role in the specialization of cells – a prerequisite for tissue formation
- ILO7 Explain how tissues form organs with specific function

BBS1001
Period 1
3 Sep 2018
26 Oct 2018
Print course description
ECTS credits:
7.0
Instruction language:
English
Coordinator:
Homeostasis and Organ Systems

Full course description

Knowledge and understanding of normal physiology of the organ systems and regulatory mechanisms will be used to go into more depth with disturbances of homeostasis. The groups will propose a RQ on a (selected) disturbance of homeostasis and design a computer-simulated experiment to test this hypothesis. Findings will be presented within the tutorial group setting. In this course, the role of several major organ systems in the maintenance of homeostasis will be studied. The focus will be on the blood circulation, the gastro-intestinal system, the pulmonary and cardiovascular system and the urinary and renal system in the filtration, reabsorption, secretion and excretion of electrolytes and water and maintenance of the acid-base balance. The interaction and communication between these organs systems will also be studied. The practical trainings will further guide understanding of normal structure and function of the organ systems, and are tailored to the learning objectives discussed in the tutorial groups. There are two practical trainings: spirometry and blood pressure measurements, and creatinine clearance measurement. In addition there will be anatomy and virtual microscopy sessions for the main organ systems, insights from these sessions will be used in the tutorials. Students will further work on academic writing skills, where the main aim of the assignment is: To write an introduction that leads to a research question (RQ) and define the required experimental aims to address this RQ. The tutorial groups will be planned in the first six weeks of the course. In the last two weeks of the course, students will work in small groups on the Academic project, in which the

Course objectives

- B-ILO1: Describes the nutrients of life and how they enter the system
- B-ILO2: Describes the role of the circulation in transporting nutrients to the various organs and explain the various transport mechanism
- B-ILO3: Explains how the structure of the cardiovascular and pulmonary systems enable and regulate gas exchange
- B-ILO4: Explains how the Bauplan of the gastro-intestinal tract facilitates passing of food through the body and to its accessory organs
- B-ILO5: Explains the role of the urinary and renal system in excretion and reabsorption of water and in maintaining the acid base balance and regulating blood pressure
- B-ILO6: Describes how communication between organ systems ensures homeostasis of the organisms
- C-ILO1: Adjusts communication written or oral, to specific global audience/readership and international setting
Bachelor Biomedical Sciences

- C-ILO2: Communicates professionally with peers and staff originating from diverse cultural and disciplinary backgrounds
- C-ILO3: Shows awareness of team roles and takes responsibly her/his position in a diversely composed international team
- C-ILO4: Works effectively in an international and intercultural team

- I-ILO1: Summarizes and reflects on social, political, international and normative issues in the biomedical science
- I-ILO2: Understands the values of and is able to apply scientific method to obtain academic knowledge, understanding and insight
- I-ILO3: Has developed a critical approach to scientific knowledge
- I-ILO4: Designs and rationalizes an biomedical experiment

- P-ILO1: Summarizes and reflects on social, political, international and normative issues in the biomedical science
- P-ILO2: Understands the values of and is able to apply scientific method to obtain academic knowledge, understanding and insight
- P-ILO3: Has developed a critical approach to scientific knowledge
- P-ILO4: Designs and rationalizes an biomedical experiment

BBS1002
Period 2
29 Oct 2018
21 Dec 2018
Print course description

ECTS credits:
7.0
Instruction language:
English
Coordinator:
  - F.R.M. Stassen

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentation(s), Skills, Training(s)
Assessment methods:
Attendance, Computer test, Portfolio, Presentation, Written exam
Fac. Health, Medicine and Life Sciences

Brain, Behavior and Movement

Full course description

This unit will be dedicated to the capacity of animals to interpret, act and move within the environment they live in. Being able to integrate incoming information and to react to it properly, e.g. by changing its position, is an essential and distinctive feature of life. For humans, the capacity to filter incoming information, reasoning and responding adequately to environmental variation, and having the ability to move are all major aspects of being, whereas a disturbance at any of these levels is an important reason for psychological and/or medical intervention. As such, adequate movement requires sensing, coordination, action generation and monitoring of the result of the action. This course will address all these features in order to understand and to be able to intervene
in human cognitive and affective functioning as well as in movement capacity.

**Course objectives**

- B-ILO1004.1. Relate body functions to the outline of the nervous system
- B-ILO1004.2. Describe how humans sense and control their position and movement in the environment
- B-ILO1004.3. Describe the control of goal-directed behavior
- B-ILO1004.4. Explain how neurotransmitters and hormones facilitate neuronal and neuromuscular communication
- B-ILO1004.5. Explain how variation in neural activation affects muscle forces
- B-ILO1004.6. Compute the force generated by a muscle-tendon complex given its morphology and its actual state
- B-ILO1004.7. Relate the function of a muscle to its position in a musculoskeletal system
- B-ILO1004.8. Explain the molecular, cellular and structural mechanisms underlying learning and memory formation
- B-ILO1004.9. Explain how the brain and body deals with exposure to acute and chronic stress and how this relates to fear and anxiety.

**Recommended reading**


BBS1004
Period 4
4 Feb 2019
5 Apr 2019
Print course description
ECTS credits:
7.0
Instruction language:
English
Coordinator:

- D.L.A. van den Hove

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentations, Skills
Assessment methods:
Bachelor Biomedical Sciences

Attendance, Final paper, Participation, Portfolio, Presentation, Written exam

Keywords:
Neuroanatomy, Sensory systems, Movement, Muscles, Postural control, Neuromechanics, Behavior, cognition, affect
Fac. Health, Medicine and Life Sciences

**Human Genetics, Reproduction and Prenatal Development**

**Full course description**

We will follow three lines which will be linked to each other:

3. Ethical questions/problems around human reproduction and genetics.

We will start studying the first differentiation steps from gametogenesis via fertilization to the very early embryonic development. This will be linked to the general concept of cell cycle regulation, cellular differentiation and types of mutations which may accompany these processes. The students will learn about the general body plan (segmentation, symmetry, body axes, development of the extremities) and the development of different organ systems (e.g. digestive system, genital system, heart, nervous system). Thereby concepts of cell-cell signalling, receptor ligand interaction, influence of hormones as mechanisms included in development will be discussed. In addition apoptosis as a mechanism included in forming of the body will be shown.

Students will be able to explain several disruptions during development and morphogenesis leading to congenital pathologies and disturbances in function. In practical trainings students will compare the “normal” human anatomy to (pathological) variations originating from aberrant human development.

In addition basic epigenetic mechanism will be shown and their implication in human development will be analysed. Existing parallels between embryonic development and cancer development during adult life will be shown exemplarily.

Chances, risks and ethical questions around human reproduction and development as in-vitro-fertilization, embryo selection, prenatal screening and increasing availability of genetic data will be discussed. In this context students will learn about the possibilities to detect and treat a monogenic disease and will be able to train the lab techniques necessary. Actual knowledge on epigenetic mechanisms leads to a broader idea of heredity transmission. Students will be made aware of the resulting inter-generational responsibility in the course of the SoPhia academic project.

**Course objectives**

- Describe how human reproduction works at the level of organ structure, function and regulation
- Describe prenatal human development from fertilisation to organogenesis
- Describe molecular mechanisms that govern proliferation and differentiation
- Explain the levels at which expression of genetic information works
- Produce a functioning expression construct by applying bioinformatics, recombinant DNA and biochemical technology
Recommended reading


BBS1005
Period 5
8 Apr 2019
7 Jun 2019

Print course description
ECTS credits:
7.0
Instruction language:
English
Coordinator:
• U. von Rango - Hilmes

Teaching methods:
Assignment(s), Work in subgroups, Lecture(s), Paper(s), PBL, Presentation(s), Skills, Training(s)
Assessment methods:
Assignment, Attendance, Final paper, Participation, Presentation, Written exam
Keywords:
Gametogenesis - Blastocyst - Implantation
Fac. Health, Medicine and Life Sciences

Threats and Defence Mechanisms

Full course description

integrated with the appropriate defence mechanisms. The most relevant entry sites with regard to these threats are the skin, the airways and the gastrointestinal tract. Different threats and different sites of entry (skin, lung, gut) require a diversity of defence mechanisms. In this course, different types of threats coming from outside the body, including injury, infections (bacterial, viral, parasitic) and toxins, are analyzed and

Hemostasis, inflammation and wound healing are the defence mechanisms against injury and bleeding. Physical, chemical and biological barriers, complement activation, inflammation, and phagocytosis form the first defence mechanisms against invading micro-organisms. Reactive oxygen species are formed by phagocytes to deal with micro-organisms. Also in response to air pollution and nanoparticles, reactive oxygen species are an important defence mechanism, whereas biotransformation deals with the excretion of toxins. A second line of defence mechanisms, as well as
Bachelor Biomedical Sciences

memory for future threats, is provided by different T- or B-lymphocyte subsets and antibodies. Each of these responses needs to be well controlled by homeostatic processes to downregulate the reaction once the threat is conquered. Furthermore, orchestration of all defence mechanisms in order to obtain the most effective response against each type of invading micro-organisms requires optimal communication between immune cells. Consequently, central themes in all defence mechanisms are intra- and intercellular communication and homeostatic responses.

Course objectives

1. Describe the mechanisms of haemostasis and thrombosis in injury and wound healing
2. Explain the pathogenesis of bacterial, viral and parasitic infections
3. Explain the innate immune responses, including recognition of damage and micro-organisms, the inflammatory process and the role of complement, neutrophils, macrophages and NK cells
4. Explain the adaptive immune responses, including recognition of antigens by B and T cells, T and B cell activation, T helper subset differentiation, isotype switching and the effector function of T helper cells, antibodies and cytotoxic T cells
5. Explain defence against xenobiotics, including particulate matter and reactive oxygen species and antioxidants in toxicological defences
6. Explain the mechanisms underlying antibiotics and the threat of antibiotics resistance

Recommended reading


BBS2001
Period 1
3 Sep 2018
26 Oct 2018
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- M.M.P.C. Donners

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, PBL, Presentations, Skills
Assessment methods:
Attendance, Participation, Presentation, Written exam
Keywords:
Hemostasis Thrombosis Innate immune system Adaptive immune system Microbiology Bacteria Viruses Toxicology Antibiotics
Fac. Health, Medicine and Life Sciences

From Cradle to Grave: Development, Ageing and Disease
Full course description

This course is dedicated to post-natal development, ageing and development of (age related) disease. Aspects of the respiratory/circulatory, urogenital and musculoskeletal systems, as well as sexual development, motor development and brain maturation and cognitive development will be explained at the molecular, cellular and functional level. At the other side of the spectrum of ‘living’, human ageing and the associated functional decline of various systems will be illustrated. In addition, during the course risk factors (genetic, lifestyle, environment) that affect development, ageing and (ageing related) disease will be discussed. The SoPhiA longitudinal track focuses on normative aspects of prevention of (later onset) disease, which are linked to the content of the course.

Course objectives

Describe post-natal development B-ILO2002.1

- Describe physical growth (including sexual maturation, muscle and bone)
- Describe brain development (cellular/structural and functional)
- Describe the post-natal development of the organ systems (i.e., heart/circulatory system, lungs, kidneys, liver, GI tract)
- Describe the development of the Immune system (i.e., bone marrow, thymus, lymphatic, gut)

B-ILO2002.2 Describe the ageing process, explain its underlying biological mechanisms and functional consequences

- Describe the evolutionary theories of ageing and use them to explain the ageing process
- Describe maintenance and repair mechanisms and explain how homeostasis changes with ageing
- Describe the hallmarks of ageing (molecular and cellular) and use them to explain the ageing process
- Explain the functional consequences of ageing with respect to muscle and bone, brain, organ systems and immune system

B-ILO2002.3 Describe the pathogenesis and explain risk factors of specific age related diseases

- Explain the interplay between stem cells, stress, ageing and disease such as cancer.
- Describe age related diseases (such as neurodegenerative disease, cardiovascular disease, musculoskeletal decline) and explain the relationship with the hallmarks of ageing.
- Explain risk factors of specific age related diseases
- Explain potential interventions to support healthy ageing

B-ILO2002.4 Explain the effect of genetics, lifestyle and environmental factors in post-natal development, the ageing process and the pathogenesis of age related diseases

Recommended reading

Books; EleUM; papers; other resources

BBS2002
Period 2
29 Oct 2018
Fat, carbohydrates and proteins are major constituents of the human diet. These three macronutrients are ultimately converted or stored as energy by a wide variety of different metabolic pathways. First, the digestion, uptake and transport of macronutrients from the intestinal tract to various organs and tissues will be addressed. This will include the enzymatic breakdown of macromolecules in the gastro-intestinal tract, and the transport and uptake of nutrients by various target organs. The nutrients also induce the secretion of signalling molecules: molecules secreted by one organ can modulate metabolism in another organ. Examples of such crosstalk between organs will be discussed. The nutrients will ultimately be used as source of energy and key-concepts of energy production in different tissues will be examined. In addition, methods and principles used to measure energy metabolism during rest and exercise will be discussed. Substrate, and substrate metabolism in general, also depends on other factors like vitamins and minerals. Importance of these (co)-factors will be discussed with referring to the role of B-vitamins in amino acid and iron metabolism. Finally, it is clear that inter-individual variation in substrate metabolism exists. It will be highlighted how this variability is related to differences in body composition, sex, and genetic background. Ultimately, this knowledge is translated into dietary recommendations. Insight will be provided how these recommendations are derived for different groups of people and if it is already possible to recommend personalized nutrition.

Course objectives

- To describe the digestion, uptake and transport of macronutrients and dietary fibres from the intestinal tract into the various organs and tissues
- To explain the cross-talk between the various organs and tissues in human substrate metabolism during the fasted and postprandial phase
- To apply principles of human energy and substrate metabolism during rest and exercise
- To integrate the role vitamins and micronutrients in human substrate metabolism
- To identify causes of inter-individual variation in human substrate metabolism
- To explain the basis for dietary recommendation
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**Recommended reading**

No specific literature will be provided to stimulate students to search their information needed for the tutorials. Students will be encouraged to use basic books.

BBS2041
Period 4
4 Feb 2019
5 Apr 2019

**Print course description**

ECTS credits:
6.0

Instruction language:
English

Coordinators:
- R.P. Mensink
- Y. Oligschläger

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, PBL, Presentation(s), Research, Paper(s)

Assessment methods:
Attendance, Participation, Presentation, Written exam, Final paper

Keywords:
nutrition, physical activity, metabolism, energy expenditure, inter-individual variation, dietary recommendations

Fac. Health, Medicine and Life Sciences

**Cell Signaling**

**Full course description**

B-ILO1 Define different cell-cell communication routes
B-ILO2 Describe the functions of cell-derived signalling molecules
B-ILO3 Explain the three major cellular signalling transduction mediators
B-ILO4 Understand the consequences of alterations in external signalling molecules (nutrients, hormones, xenobiotics)
B-ILO5 Define the integration and dynamics of different cell signalling pathways
B-ILO6 Understand the application of recent biotechnology techniques in cell signalling research
B-ILO7 Relate altered cell signalling to pathological development

**Recommended reading**

There is no specific literature. Instead, information from text books (recommended: Alberts et al. Molecular Biology of the Cell), PubMed, provided papers via Eleum and reliable internet sources can be used.

BBS2042
Period 4
4 Feb 2019
Bachelor Biomedical Sciences
5 Apr 2019
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinators:
  - J.J. Briedé
  - J.W. Renes
Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentations, Training(s), Working visit(s)
Assessment methods:
Assignment, Attendance, Final paper, Participation, Written exam
Keywords:
Cellular communication routes Signal transduction Pathological development Recent biotechnology techniques
Fac. Health, Medicine and Life Sciences

Biorhythms in Homeostasis

Full course description

The ability to maintain homeostasis is a prerequisite for life in general. Embedded in homeostatic control lays rhythmic control which help to maintain body and cellular function, but are also important to adjust the human body to rhythms that are enforced on us by nature, of which day and night is the best-known example. Next to these environmental factors, also other external stimuli threaten homeostasis of the human body.

During this course, the knowledge gained from the first-year course "Homeostasis and organ systems" (BBS1002) will be refreshed and extended. The basic principles of hormonal, neural and other regulation systems will be studied around the overarching theme of body weight regulation. The regulation of body weight starts at the level of the nucleus and cell, where gene transcription is regulated by the molecular clock, leading to rhythmicity in gene expression patterns. At the organ level, hormones, including adipokines are secreted to regulate metabolic processes that are involved in the maintenance of body weight. At a macro level, body weight is also regulated by patterns of physical activity, food intake and energy homeostasis (supply and demand). A complicating factor in body weight regulation in humans are societal, cultural and environmental factors that also affect body weight, and these environmental factors may be exposed on us in a rhythmic manner too.

Students will learn the basics of the regulation factors in the form of six cases, supported by one lecture per theme. An important part of the course consists of applying knowledge in projects, around five different themes. In every theme, approximately 5 students will work together. The product of the project teams is two-fold: a symposium (oral and poster presentation) for peers and stakeholders (patients, industrial partners, lay people, health professionals etc.).

Course objectives

- B-ILO1 Understands the concept of regulatory systems and how positive and negative feedback systems function in maintaining homeostasis
Bachelor Biomedical Sciences

- B-ILO2 Understands the concept of rhythmicity at different levels (molecular, circadian, seasonal) and how this affects regulatory systems
- B-ILO3 Integrates short- and long-term regulatory systems and rhythmicity into body weight regulation
- B-ILO4 Argues how challenges to the control system result in dysregulation and adaptation to a new set-point which can be modulated by interventions (pharmacologically, lifestyle)
- B-ILO5 Discusses how external cues challenge the regulatory system
- B-ILO6 Applies acquired knowledge of control systems in a predefined scenario and translates this into advice to stakeholder
- B-ILO7 Applies appropriate statistics (logistic regression) to a dataset derived from practical during course

BBS2051
Period 5
8 Apr 2019
7 Jun 2019
Print course description
ECTS credits:
6.0
Instruction language:
English
Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentations, Training(s)
Assessment methods:
Assignment, Attendance, Participation, Presentation, Written exam
Fac. Health, Medicine and Life Sciences

Neuromuscular Control of Movement

BBS2052
Period 5
8 Apr 2019
7 Jun 2019
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinators:
- M.R. Drost
- K. Meijer

Fac. Health, Medicine and Life Sciences

Systems Biology

Full course description

Recent advances in technology and in the analyses of biomolecules (DNA, RNA, proteins and metabolites) allow determining the levels of millions of hits at the same time in specimens. It is now
possible to identify in one shot all mutations and chromosomal rearrangements present in one subject or in a patient; to determine the level of expression of the ±20,000 human genes, the hundreds of thousands of proteins and of several biological metabolites including sugars, lipids, hormones, etc. This is the ‘omics’ revolution.

In biomedical science, such ‘omics’ approaches have changed several paradigms, in particular the use of single biomarkers in diagnostics and prognostics is shifting to the use of biomarker signatures, and the integration of different ‘omics’ data. Performing such analyses is only possible today through the aid of bioinformatics and system biology.

In this course, some basic knowledge and tools used in ‘systems biology’ will be taught. Breast cancer will be used as an example throughout the course.

**Course objectives**

- Understand the added value of systems biology in biomedical research
- Describe how systems biology can help improve healthcare (in terms of better diagnosis, improved prognosis and personalised treatment)
- Use and process the relevant datasets and information sources to solve problems/answer research questions with systems biology approaches
- Select the correct computational methods and tools to answer research questions (of clinical relevance) using systems biology approaches

**Recommended reading**

3. https://wiki.cancerimagingarchive.net/display/Public/TCGA+Breast+Phenotype+Research+Group

BBS2061
Period 6
10 Jun 2019
5 Jul 2019
[Print course description](#)

ECTS credits:
5.0

Instruction language:
English

Coordinators:
- A. Romano
- M. Summer - Kutmon

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, PBL, Presentations, Research, Skills, Training(s)

Assessment methods:
Assignment, Attendance, Final paper, Participation, Presentation

Keywords:
BREAST CANCER SYSTEM BIOLOGY CLASSIFICATION PROGNOSIS DRUG RESPONSE
Allometry

Full course description

In a strict sense, the term 'allometry' originally referred to the scaling relationship between the size of a body part and the size of the body as a whole. More broadly, allometry is concerned with biological scaling relationships in general, including morphological traits (e.g. the relationship between brain size and body size), physiological traits (e.g. the relationship between metabolic rate and body size) or even ecological traits (e.g. the relationship between body size and territory size). Indeed, allometric relationships can be described for almost any pair of co-varying biological measurements. For biomedical sciences, such allometric relations (or the deviation thereof) have huge implications for the extrapolation of study data from cells to animals to humans, for example in the field of drug development. In addition, allometry is used to assess or correct for the influence of the variable body size within human study populations.

The course will begin with a general introduction on the influence of body size. Next, specific examples will be studied to gain a broader understanding of the topic. Examples of allometric relations in biomedical sciences we will study during the PBLs and lectures are skeletal dimensions, cardiac function, energy metabolism, thermoregulation, movement efficiency and pharmacokinetics. Allometric relations within the student population will be determined during the practicals body composition, electrocardiography, gait transition and pharmacokinetics/pharmacodynamics. In addition, students will collaborate in a project where they explore a variety of topics related to the influence of animal/body size.

Course objectives

B-ILO1001.1
To understand the nature of allometric scaling laws

B-ILO1001.2
Explain how body size affects body structure

B-ILO1001.3
Explain how body size affects (energy) metabolism

B-ILO1001.4
Know the implications of allometric scaling for biomedical research: how to extrapolate from mouse to man

B-ILO1001.5
Demonstrate taking allometric scaling into account in human studies: how to correct for body size

Recommended reading

Sensorimotor Behaviour and Neuroplasticity

Full course description

Given the importance of human movement in many aspects of daily life, and arm-hand movements in particular, it is crucial to understand how the brain converts sensory information into goal-directed motor actions. This course provides an in-depth treatment of brain-movement relationships, focusing on sensorimotor transformations that underlie arm reaching and how it can adapt to changing circumstances. Adaptations in movements under changing circumstances are covered with the concept of neuroplasticity, the notion that the brain is dynamic by rewiring itself contingent on task demands and new experiences. Finally, this course invites the students to link the acquired knowledge on sensorimotor transformations with the exciting, surging field of brain-computer interfaces (BCI), which allow compensation for lost motor function, for instance in people suffering from spinal cord injury or stroke.

Course objectives

- Explain sensorimotor transformations underlying arm reaching
- Design, assess, and interpret experimental manipulations disturbing arm reaching at the level of perception, planning and execution
- Explain determinants and mechanisms of neuroplasticity at the molecular, cellular, and organization level
- Describe basic principles and applications of Brain-Computer Interfaces (BCI)

Recommended reading

Bachelor Biomedical Sciences


BBS2063
Period 6
10 Jun 2019
5 Jul 2019

Print course description
ECTS credits:
5.0
Instruction language:
English
Coordinator:
- J.J.M.E. Adam

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentations, Research
Assessment methods:
Assignment, Attendance, Final paper

Keywords:
hand-arm function - sensorimotor control - perception-action coupling - neuroplasticity - brain-computer interfaces

Fac. Health, Medicine and Life Sciences

Practicals The LEGO Bricks of Life

Full course description

This course will have 4 practical trainings:

1. Good laboratory practice (GLP)
Part 1: Safety regulations, environmental safety and standard materials in a lab (glassware, balance, pipets etc.). This part will include instructions about how to use standard lab materials.
Part 2: Students learn how to use various lab materials in more detail. This part will contain an interim test: Making your own calibration curve by spectrophotometry and Excel. Students have to show their ability to make a calibration curve. The slope of regression line and variation between duplicates will be checked. If students have values that are >10% deviant from the expected value, they will have to make a new calibration curve (immediate feedback). In this practical, simple bioinformatics will be included by the use of Excel. How to prepare a calibration curve in Excel will be introduced during this practical training.

2. Effect of pH on enzyme activity.
Different buffers will be used to perform the test at various pH-conditions. The pH and preparation of these buffers will also be discussed and calculated as additional task in case 4 of course bbs1001. The calibration curve was already produced in practical 1, part 2.

3. Virtual microscopy
An introduction is provided how to fulfil the tasks in virtual microscopy training. This training deals with general histology, which shows how various cell types build organs.
Bachelor Biomedical Sciences

4. Introduction to the dissection Hall
In the coming courses, human anatomy will be studied on real human bodies/preparations. Students need to be introduced properly before they are allowed to join practical trainings in the dissection hall of Maastricht University.

Course objectives
You will have to prepare for all practicals. Your preparation will be checked, and you are only allowed to start the practical if your preparation is considered sufficient. All practical trainings will be evaluated by inspection of the lab-journal and specific questions in the final exam.

BBS1101
Period 1
3 Sep 2018
26 Oct 2018
Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinator:

• R.W.L. Godschalk

Teaching methods:
Assignment(s), Lecture(s), Skills
Assessment methods:
Assignment, Attendance, Participation
Keywords:
Basic laboratory skills Good laboratory Practice Laboratory Safety guidelines spectrophotometry
Fac. Health, Medicine and Life Sciences

Practicals Homeostasis and Organ Systems

BBS1102
Period 2
29 Oct 2018
21 Dec 2018
Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinator:

• F.R.M. Stassen

Fac. Health, Medicine and Life Sciences
Practicals Brain, Behavior and Movement

BBS1104
Period 4
4 Feb 2019
5 Apr 2019
Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinator:
- D.L.A. van den Hove

Fac. Health, Medicine and Life Sciences

Practicals Human Genetics, Reproduction

Full course description

Practical 1: Anatomy - Blastocyst development/Implantation/Early development
Students will learn about the development during week 1-4 of embryonic development. They will study how to judge the adequate development during fetal and embryonic period.

Practical 2: Anatomy - Body Plan + Gut
Students will study general aspects of the body plan and will have a special look on the macroscopy of the gut system.

Practical 3: Anatomy - Sexual differentiation - virtual microscopy
Development of the gonads and differentiation of germ cells will be studied.

Practical 4: Anatomy sexual organs
Students will study the topography of the sexual organs in focusing on developmental aspects.

Practical 5: Devolpemnt of the heart
Students will study the the heart in focusing on developmental aspects.

Lab practical 1: DNA isolation
Student will isolation of genomic DNA from buccal cells and prepare lab buffers for practical days 2 and 3.

Computer practical: Online Mendelian Inheritance in Man (OMIM) and NEBcutter
Student will learn how to browse and interpret OMIM entries and they will learn how to use NEBcutter for restriction enzyme analysis.

Lab practical 2: DNA concentration analysis and PCR
Student will analyze the concentration of their DNA and perform a Polymerase Reaction (PCR) for Clade Marker M270.

Lab practical 3: DNA visualization
Student will perform restriction enzyme digestion and will visualize the experimental products with
Recommended reading


BBS1105
Period 5
8 Apr 2019
7 Jun 2019

Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinator:

- U. von Rango - Hilmes

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Skills, Training(s)
Assessment methods:
Final paper, Written exam
Keywords:
early human development organogenesis virtual microscopy gross anatomy lab techniques - analysis of the genetic code find online information on the genetic code
Fac. Health, Medicine and Life Sciences

Practicals From Cradle to Grave: Development, Ageing and Disease

Full course description

This course is dedicated to post-natal development, ageing and development of (age related) disease. Aspects of the respiratory/circulatory, urogenital and musculoskeletal systems, as well as sexual development, motor development and brain maturation and cognitive development will be explained at the molecular, cellular and functional level. At the other side of the spectrum of 'living', human ageing and the associated functional decline of various systems will be illustrated. In addition,
Bachelor Biomedical Sciences

during the course risk factors (genetic, lifestyle, environment) that affect development, ageing and (ageing related) disease will be discussed.

During the course 5 practical trainings will be provided which support the subjects discussed in the tutorial meetings. As a part of those practical trainings bioinformatics is given.

1. **Functional test**: comparison of young, adult and elderly people, correlate physical activity with score form (PASE). Perform ANOVA (~statistics)
2. **Virtual microscopy brain development**
3. **Use of data resources** (bio-informatics) Bio-informatics will be applied to learn more about online resources to find out more about genes, proteins, metabolites, and their functions and regulation.
4. **TBARS**: Test effect of dietary antioxidants on lipid peroxidation in liver or brain homogenate in vitro
   1) Design practical protocol
   2) Write a report
   3) Perform ANOVA (~statistics)
   4) Feedback on lab notebook
5. **Visualization of the hallmarks of cancer (e.g. virtual microscopy)**: hyperplasia, dysplasia and stem cells

**Course objectives**

I-ILO4: Designs and rationalizes an biomedical experiment

- Bio-informatics will be applied to learn more about online resources to find out more about genes, proteins, metabolites, and their functions and regulation.
- Results of practical training 1 and practical training 4 will be analyzed using ANOVA
- Protocols, experiment and results concerning Practical trainings 4 will be recorded in the Lab Journal.

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BBS2102
Period 2
29 Oct 2018
21 Dec 2018

Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinators:

- **M.A. Dentener**
- **A.H.N. Hopman**

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), Research, Skills
Assessment methods:
Assignment, Attendance, Final paper, Participation, Written exam
Fac. Health, Medicine and Life Sciences
Practicals Human Intermediary Metabolism

Full course description

Anatomy: Liver and pancreas

For this training, sections from parts of the liver and pancreas will be given. Structure and structure-function relationships are studied on a histological level.

Anatomy: Muscle

For this training, sections from parts of different types of muscles will be given. Structure and structure-function relationships are studied on a histological level.

Body composition

Various methods (measurement of body volume by underwater weighing, skin fold measurements, measurement of bio-impedance, and measurement of body height) will be applied and the theory behind these measurements will be discussed.

Food intake

Students will record on one working day and one weekend day. Food intake will be converted into energy and macronutrient intake. Results of all students will be collected and differences in intake between the working day and weekend day will be statistically examined. Intakes will be compared with official dietary recommendations.

Course objectives

- To describe the digestion, uptake and transport of macronutrients and dietary fibres from the intestinal tract into the various organs and tissues
- To explain the cross-talk between the various organs and tissues in human substrate metabolism during the fasted and postprandial phase
- To apply principles of human energy and substrate metabolism during rest and exercise
- To integrate the role vitamins and micronutrients in human substrate metabolism
- To identify causes of inter-individual variation in human substrate metabolism
- To explain the basis for dietary recommendation

BBS2141
Period 4
4 Feb 2019
5 Apr 2019

Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinators:
- R.P. Mensink
- Y. Oligschläger
Practicals Cell Signaling

Full course description

This course will have 3 practical trainings:

**Practical 1: Ah-receptor (connection to B-ILO3)**

Students will use in vitro cultured cells and incubate these with an Ah-receptor ligand. Activation of the Ah-receptor will be monitored by a fluorescent read-out of the CYP1A activity. Students are expected to elucidate the signalling pathway between the ligand > Ah-receptor > CYP1A activity. This practical training involves a large data set that should be analysed with proper statistical methods. Students will write a report about this practical training which will be assessed with formative feedback.

**Practical 2: Muscle contraction by Ca2+ (connection to B-ILO4)**

In this practical training muscle contraction will be studied by exposing isolated muscles to Ca2+. Ca2+ works via membrane-bound receptors. Students are expected to elucidate the Ca2+-induced signalling pathway that leads to muscle contraction.

**Practical 3: Visualisation and modulation of cell signalling pathways in (patho)physiological conditions (connection to B-ILO 3,4,5)**

In this practical training bioinformatics, particularly pathway visualisation, will be applied to monitor cellular signalling pathways. The modulation of single signal transduction routes by different compounds (nutrients, hormones) will be visualized. In addition, integration of different cell signalling pathways will be visualized to gain a better understanding of the complexity of the cell signalling network.
Bachelor Biomedical Sciences

In this practical training bioinformatics, particularly pathway visualisation, will be applied to monitor cellular signalling pathways. The modulation of single signal transduction routes by different compounds (nutrients, hormones) will be visualized. In addition, integration of different cell signalling pathways will be visualized to gain a better understanding of the complexity of the cell signalling network.

**Course objectives**

B-ILO3 Explain the three major cellular signalling transduction mediators
B-ILO4 Understand the consequences of alterations in external signalling molecules (nutrients, hormones, xenobiotics)
B-ILO5 Define the integration and dynamics of different cell signalling pathways

**Recommended reading**

There is no specific literature. Instead, information from text books (recommended: Alberts et al. Molecular Biology of the Cell), PubMed, provided papers via Eleum and reliable internet sources can be used.

BBS2142
Period 4
4 Feb 2019
5 Apr 2019
Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinators:
- J.J. Briedé
- J.W. Renes

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), Research, Skills
Assessment methods:
Assignment, Attendance, Final paper, Participation, Written exam
Keywords:
Cell culture General lab work Muscle preparation Lab journal Statistical analysis Bioinformatics
Fac. Health, Medicine and Life Sciences

**Practicals Threats and Defence Mechanisms**

BBS2101
Period 1
3 Sep 2018
26 Oct 2018
Print course description
ECTS credits:
0.0
Introduction to Statistical Methods for Data Analysis

Full course description

In this course, statistical methods are introduced that can be used in all kinds of research problems encountered in Biomedical science.

The focus is on statistical concepts and techniques that play a role in summarizing and describing observed variables and relationships between variables, as well as generalizing the results for a larger group than the observed group. The first theme of this course is to summarize the observed data. The second theme is the testing concept. The third theme pertains to various basic statistical techniques that are used to analyse observed data.

Some best practice statistical methods will be introduced and are considered as standard methods to deal with the above stated questions.

Course objectives

Important learning goals in this course are:

- Knowledge of descriptive statistics (including frequency, average, median, standard deviation, cross-classified table among others).
- Knowledge of the principles of inferential statistics, such as population distribution, sample distribution, sampling distribution, central limit theorem, hypothesis testing, p-value, and confidence interval.
- Knowledge of the basic principles and concepts of elementary statistical techniques (including t-test, chi-square test, and simple linear regression).
- Knowledge of the differences and similarities between the various basic techniques (such as a t-test and simple linear regression).
- Ability to perform a simple test (t-test, chi-square test) with SPSS.
- Ability to perform a simple linear regression analysis with SPSS.
- Ability to interpret adequately the results of the learned statistical analysis in view of the research question and, in doing so, to provide critical comments.
Bachelor Biomedical Sciences

5.0
Instruction language:
English
Coordinator:

- S. Vanbelle

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, PBL, Presentation(s), Skills
Assessment methods:
Assignment, Written exam
Fac. Health, Medicine and Life Sciences

Philosophy in Action I

BBS1008
Period 5
8 Apr 2019
7 Jun 2019
Print course description
ECTS credits:
2.0
Instruction language:
English
Coordinator:

- G.M.W.R. de Wert

Fac. Health, Medicine and Life Sciences

Critical Appraisal of Biomedical Publication

Full course description

Biomedical Sciences covers a broad range of different research approaches and study designs. Results from these studies are reported in articles published in a wide range of journals. Information from these articles is vital for the progression of science. However, a critical view on biomedical publications is necessary to maintain the required level of scientific quality. The design of a study by using the empirical cycle, and the way the study design and results are reported are the main items of the course Critical Appraisal of Biomedical Publications (BBS1006). This course will teach students to recognise and value the diversity of study designs and to critically appraise how results of these studies are reported. The course uses a competency-based approach and will enable students to critically review research quality and methodology as they are used in daily practice. This is done by means of lectures, team-based learning sessions and journal clubs. During this 4-week course students are trained to make so-called critical appraisals of biomedical publications (CABPs) reports. One CABP report will serve as a practice run and will be discussed according to provided feedback. The second CABP report is assessed. Since research not only involves correct reporting but also hands-on skills, a lab-skill test and a calculation test will be conducted in parallel to the theoretical approach. These tests will be assessed. Success in BBS1006 requires a strong collaborative approach to critically assess biomedical publications and research methodology. Furthermore, a critical attitude towards own hand-on skills is required. BBS1006 is assessed with an
Bachelor Biomedical Sciences

exam at the end of the course using multiple choice questions that measure critical thinking about a provided article.

Course objectives

- Recognise and describe the empirical cycle in published biomedical articles
- Gain knowledge on the technical aspects of a biomedical publication
- Argue/ value the quality aspects of a biomedical publication with respect to hypothesis, introduction, study design, research methodology, results reporting, results discussion and conclusions.
- Suggest alternatives and solutions related to flaws in publications
- Make supported decisions/ balanced choices when designing a biomedical study
- The students develop a critical attitude towards research methodology

Recommended reading

- A number of biomedical publications
- Several quality checklists
- Literature around quality checklists
- Various books on research methodology

BBS1006
Period 6
10 Jun 2019
5 Jul 2019
Print course description
ECTS credits:
3.0
Instruction language:
English
Coordinator:

- J.W. Renes

Teaching methods:
Assignment(s), Work in subgroups, Lecture(s), Presentations, Research, Skills, Training(s)
Assessment methods:
Assignment, Attendance, Final paper, Participation, Portfolio, Written exam
Keywords:
Critical appraisal, study design, research methodology, (non)experimental studies
Fac. Health, Medicine and Life Sciences
Non-invasive Techniques in Biomedical Research

Full course description

Imaging is a crucial step to visualize and conceptualize important processes in health and disease on various scales, ranging from molecular detail, via cellular and tissue level, towards animal and patient. In this 4-weeks course various non-invasive imaging techniques, frequently used in both research and clinic, will be introduced and discussed. These techniques are MRI/MRS, PET/CT, MS Imaging, and Breath/faeces analysis. Furthermore, advanced optical microscopy will be introduced, since this is an important, albeit invasive, supportive technique.

Combining lectures, practicals, and dedicated tutorials, in the first two weeks all the mentioned imaging methods will be introduced in general terms. After these two weeks, the group will be divided over five topics (MRI/MRS; PET/CT; MSI; B/F analysis; and Optical Microscopy). The topic will, within this group, be discussed in more detail. During weeks 2 to 4 the students will work on writing an Imfolio in small subgroups, containing up-to-date information on the topics of each week (practicals, lectures).

While each group during the last 2 weeks will go into details on one topic only, the general line of imaging methods will come back in the final assignment. Subgroups will work on the assignment from the start of the block. They will of the (other) subgroups. Both defense and asking questions to other groups will be graded, including self-assessment.presencedefend their assignment at the end of the block in the

Course objectives

B-ILO-1: Student s learn the difference between various non-invasive imaging techniques. B-ILO-2: Students can select and apply the best (combination of) methods to a specific question in ether clinical or research setting. B-ILO-3: Students can deal with complex data in a practical setting. B-ILO-4: Students have in-depth knowledge on one of the following techniques:

- MRI/MRS
- PET/CT
- Mass Spectroscopic Imaging
- Optical Microscopy
- Breath and Faeces analysis

Recommended reading

Will be discussed during the block

BBS2003
Period 3
7 Jan 2019
1 Feb 2019
Print course description
ECTS credits:
5.0
Instruction language:
Bachelor Biomedical Sciences

English

Coordinators:

- M.A.M.J. van Zandvoort
- A.M. Blanchem - Smolinska

Teaching methods:
Assignment(s), Work in subgroups, Lecture(s), Paper(s), PBL, Presentations, Skills

Assessment methods:
Assignment, Attendance, Portfolio, Presentation

Keywords:
Non-invasive imaging Biomedical research Medical research
Fac. Health, Medicine and Life Sciences

Statistics: Regression Analysis, ANOVA, Logistic Regression, Repeated Measurements

Full course description

In this course the statistical techniques linear regression, analysis of variance, logistic regression, and analysis of repeated measurements are introduced. With these techniques a broad range of statistical analyses of biomedical data can be conducted.

Course objectives

Goals: Linear regression, analysis of variance, logistic regression analysis, analysis of repeated measurements. The student learns the most important concepts associated with these techniques. The student is able to apply these techniques with the statistical package SPSS on real data. The student is able to interpret the obtained results.

Concepts: dependent variable, independent variable, intercept, slope, standard error, t-test for coefficient, t-value, p-value, confidence interval for coefficient, continuous and categorical independent variables, dummy variables, F-test for set of independent variables, residual plot, histogram of residuals, normal probability plot, interaction, R-square, sum of squares, multiple comparisons, Bonferroni adjustment, relation between regression analysis and analysis of variance, transformation of dependent variable, estimation of conditional means, multicollinearity, variance inflation factor, vif, dichotomous dependent variable, relative risk, odds, odds ratio, confidence interval for odds ratio, Hosmer and Lemeshow goodness of fit test, fixed effect variable, random effect variable, mixed model.

Recommended reading

Bachelor Biomedical Sciences

Year
3 Sep 2018
7 Jun 2019

Print course description

ECTS credits:
3.0

Instruction language:
English

Coordinator:
- A.W. Ambergem

Teaching methods:
Lecture(s), Training(s)

Assessment methods:
Attendance, Written exam

Keywords:
Linear regression, analysis of variance, logistic regression, analysis of repeated measures.

Fac. Health, Medicine and Life Sciences

Philosophy in Action II

Full course description

Sophia II is taught in two separate trajectories, one in autumn and one in spring.

In the first part of the Sophia II trajectory, students will be made aware of and analyze the ethical aspects of both predictive genetic testing for (future) diseases and the trend to emphasize ‘personal and parental responsibility for health’.

In the second part of the Sophia II trajectory, students will venture into the philosophy and the sociology of science. Both of these disciplines study science, its processes, its object, its culture and its inhabitants not unlike science itself studies a multitude of natural or social objects. Over the course of the Sophia trajectory ‘Credibility in and of science’, students will encounter a number of (probably) familiar and (possibly) less familiar ways to think about what science is and does, and how it is related to society at large.

Combined, the two parts of Sophia II will offer students the capacity to critically reflect on social, political, international and normative issues in biomedical science and critically reflect on the nature of science itself.

The mark is calculated as the average of the mark for the course part I and course part II [50% each], in which part I requires attendance at the symposium, a passing grade for the presentation and reflection and a sufficient score for the group paper. Part II requires attendance in group discussion meetings and its grade is derived from the pod-cast mark (85%) and the group reflection (15%).

Course objectives

I-ILO1: Summarize and reflect on social, political, international and normative issues in biomedical science
The Core of Biomedical Sciences

BBS3004
Period 4
4 Feb 2019
5 Apr 2019
Print course description
ECTS credits:
5.0
Instruction language:
English
Coordinators:

- M. de Ligt
- T. Porta

Fac. Health, Medicine and Life Sciences

Philosophy in Action III

Full course description

The course ‘Sociology and Philosophy in Action III, Books and Letters’ challenges students to understand science philosophical and sociologic positions, as well as multiple views of science and the relationship between science and society, to apply this knowledge to explain or contrast these different views through a twofold process of first familiarising oneself with a subset of them and subsequently use these positions to participate in ongoing scientific debates.
To this end, students will read, in full, an approved book drawn from the philosophy, sociology or history of science and translate its conceptual apparatus to a scientific debate of their own selection. This will allow them to synthesize conceptual understanding of biomedical science with actual scientific problems or public dilemmas and constructively participate in scientific exchanges.
As part of the course, students will receive instructions in the form of lectures and meetings to help
Bachelor Biomedical Sciences

them review the relevant literature, draft their own contributions, review peer contributions, work with reviews of their own work and compile all elements in a portfolio. The course will be assessed through two written assignments. The book review counts towards 40% and the portfolio of letters and reviews counts towards 60% of the grade.

**Course objectives**

Detailed learning objectives are listed in the course book:

1. You will have knowledge and understanding of science philosophical positions, as well as of multiple conceptualisation of science and the relationship between science and society;
2. You can apply this knowledge to explain or contrast or confront one view of science and scientific practice with others, as they populate science and society;
3. You can assess science philosophical problems critically and provide arguments for said assessment;
4. You can position science theoretical and science political issues (within the broader realm of the biomedical sciences) in a wider societal perspective.
5. You can synthesize conceptual understanding of biomedical science with actual scientific problems or public dilemma’s.
6. You can translate conceptual understanding from its source [book project] to real-world problems [the letter project].
7. You can actively and constructively participate in scientific exchanges.

BBS3007
Period 4
4 Feb 2019
5 Apr 2019
Print course description
ECTS credits:
2.0
Instruction language:
English
Coordinator:

- G.M.W.R. de Wert

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s)
Assessment methods:
Assignment, Portfolio

**Competence Communicator and Collaborator**

Fac. Health, Medicine and Life Sciences

**Scientific Writing I**

BBS1021
Year
1 Sep 2018
5 Jul 2019
Bachelor Biomedical Sciences

Print course description
ECTS credits: 4.0
Instruction language: English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Presenting, Intercultural Awareness I

BBS1022
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits: 2.0
Instruction language: English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Cooperation and Communication (MSF)I

BBS1023
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits: 4.0
Instruction language: English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Scientific Writing II

BBS2010
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
Bachelor Biomedical Sciences
4.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

Teaching methods:
Assignment(s)
Assessment methods:
Final paper
Fac. Health, Medicine and Life Sciences

**Presenting, Intercultural Awareness II**

BBS2011
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
2.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

Teaching methods:
Presentation(s)
Assessment methods:
Presentation
Fac. Health, Medicine and Life Sciences

**Cooperation and Communication (MSF) II**

BBS2012
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
4.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

Teaching methods:
Work in subgroups, PBL
Assessment methods:
Observation, Portfolio
Scientific Writing III: Thesis

BBS3040
Year
1 Sep 2018
31 Aug 2019
[Print course description]
ECTS credits:
2.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Presenting III: Thesis

BBS3041
Year
1 Sep 2018
31 Aug 2019
[Print course description]
ECTS credits:
1.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Communication and Cooperation (MSF) III

BBS3042
Year
1 Sep 2018
5 Jul 2019
[Print course description]
ECTS credits:
1.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans
Bachelor Biomedical Sciences

Competence Professional and Organisor

Fac. Health, Medicine and Life Sciences

Laboratory Practice

BBS1038
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
4.0
Instruction language:
English
Coordinator:

  • J.M.E.M. Cosemans

Teaching methods:
Skills
Assessment methods:
Assignment, Attendance
Fac. Health, Medicine and Life Sciences

Lab Skills Test

BBS1032
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
0.0
Instruction language:
English
Coordinator:

  • J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Professional Behaviour (MSF) I

BBS1035
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits:
3.0
Bachelor Biomedical Sciences
Instruction language: English
Coordinator:
  - J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

Professional Development I

BBS1039
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits: 3.0
Instruction language: English
Coordinator:
  - J.M.E.M. Cosemans

Teaching methods:
Work in subgroups
Assessment methods:
Portfolio
Fac. Health, Medicine and Life Sciences

Lab Notebook

BBS2030
Year
1 Sep 2018
5 Jul 2019
Print course description
ECTS credits: 2.0
Instruction language: English
Coordinator:
  - J.M.E.M. Cosemans

Teaching methods:
Skills
Assessment methods:
Attendance, Observation
Fac. Health, Medicine and Life Sciences
Bachelor Biomedical Sciences

**Professional Behaviour (MSF) II**

BBS2031
Year
1 Sep 2018
5 Jul 2019
[Print course description](#)
ECTS credits:
4.0
Instruction language:
English
Coordinator:
- J.M.E.M. Cosemans

Teaching methods:
Work in subgroups, PBL
Assessment methods:
Observation
Fac. Health, Medicine and Life Sciences

**Professional Development II**

BBS2032
Year
1 Sep 2018
5 Jul 2019
[Print course description](#)
ECTS credits:
4.0
Instruction language:
English
Coordinator:
- J.M.E.M. Cosemans

Teaching methods:
Work in subgroups
Assessment methods:
Portfolio
Fac. Health, Medicine and Life Sciences

**Professional Behaviour (MSF) III**

BBS3050
Year
1 Sep 2018
5 Jul 2019
[Print course description](#)
ECTS credits:
1.0
Instruction language:
Bachelor Biomedical Sciences

English
Coordinator:

- J.M.E.M. Cosemans

Fac. Health, Medicine and Life Sciences

**Professional Development III**

BBS3051
Year
1 Sep 2018
5 Jul 2019
[Print course description](#)
ECTS credits:
1.0
Instruction language:
English
Coordinator:

- J.M.E.M. Cosemans

**Thesis**

**Integrated Competencies Biomedical Sciences**

Fac. Health, Medicine and Life Sciences

**Internship**

BBS3005
Period 5
8 Apr 2019
7 Jun 2019
[Print course description](#)
ECTS credits:
12.0
Instruction language:
English
Coordinator:

- J.W.E. Jocken

Fac. Health, Medicine and Life Sciences

**Thesis**

BBS3006
Period 5
8 Apr 2019
7 Jun 2019
Global Differences in Disease and Treatment

BBS3011
Period 1
3 Sep 2018
26 Oct 2018

ECTS credits:
12.0
Instruction language:
English

Coordinators:
- L.M.T. Eijssen
- E. Ambrosino

Drug Therapy: From Confection to Tailor-made

BBS3012
Period 2
29 Oct 2018
21 Dec 2018

ECTS credits:
12.0
Instruction language:
English

Coordinators:
- G.J.M. den Hartog
- A.R. Weseler

Minor

Fac. Health, Medicine and Life Sciences
The Role of Nutrition in the Life Cycle in Relation to Global Health

BBS3021
Period 1
3 Sep 2018
26 Oct 2018

Print course description
ECTS credits:
12.0
Instruction language:
English
Coordinators:

• E.E. Blaak
• J. Plat

Fac. Health, Medicine and Life Sciences

Clinical and Personalized Nutrition

BBS3022
Period 2
29 Oct 2018
21 Dec 2018

Print course description
ECTS credits:
12.0
Instruction language:
English
Coordinators:

• E.E. Blaak
• J. Plat

Fac. Health, Medicine and Life Sciences

Global Differences and Scientific Evidence for Physical Activity as Treatment/Preventive Measure

Full course description

During this course students learn to appreciate the worldwide and historical diversity of physical activity (PA) intervention as a means to enhance health. The way people appreciate PA varies over continents and through time. PA has been and is applied to prevent and cure health issues and is also used as a means in rehabilitation and PA to improve daily performance and function. Students will learn how to measure PA and daily performance and function, and their components (endurance, strength, flexibility, coordination). In addition, this course will address scientific evidence for claimed effects of PA-interventions and their components on various health (risk) outcomes. Apart from the diverse separate small skills trainings there will be one large 'experiment' in which
students will experience and train a physical activity exercise program themselves (during 8 weeks - half in module 1 and half in module 2) and assess it's effect. This means developing and writing a research protocol, executing and evaluating it.

**Course objectives**

- B-ILO3031.1: To understand the Physical activity dimensions: mode, frequency, duration and intensity; both for inactivity and exercise
- B-ILO3031.2: To understand the strengths and weaknesses of the main types of physical activity monitoring
- B-ILO3031.3: To identify causes of inter-individual variation in human performance
- B-ILO3031.4: To select an adequate assessment method of functional performance capacity for a given population and research question
- B-ILO3031.5: To design an exercise-training program adequate for the goal chosen both in healthy subjects, and in patients suffering from chronic diseases

**Recommended reading**

ill be provided during the course

BBS3031
Period 1
3 Sep 2018
26 Oct 2018
[Print course description](#)

ECTS credits:
12.0

Instruction language:
English

Coordinators:
- **R.A. de Bie**
- **M.R. Drost**

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Research, Skills, Training(s)

Assessment methods:
Assignment, Written exam

Keywords:
physical activity, assessment methods, exercise, global burden of disease, co-morbidities, mental effects of PA, PA skillstraining

Fac. Health, Medicine and Life Sciences

**Physical Activity Applications in Health and (Daily) Performance; From Man to Molecule**

**Full course description**

In this course students will learn to appreciate how PA, be it intense PA (exercise (EX)), low intense PA or sedentary behavior (SB) affects health at a molecular level and how such molecular adaptation
affects people and their health. This will be studied in the context of:

- a range of non-communicable, lifestyle-related diseases
- ageing
- cognitive performance over the range of a lifetime
- enhancing of regaining functional, daily or sports performance

Course objectives

- B-ILO3032.1: To evaluate differential effects of training programs aimed at physical activity improvement
- B-ILO3032.2: To understand and argue the impact of various co-morbidities on physical activity possibilities and outcomes
- B-ILO3032.3: To apply principles of human energy metabolism during rest and exercise (see also B-ILO2041.3)
- B-ILO3032.4: To identify causes of change in performance as a function of age
- B-ILO3032.5: To understand the mental effects of physical activity interventions in healthy persons and subgroups of persons with a chronic disease
- B-ILO3032.6: To argue which elements of a physical activity training program are key to achieve optimal training effect in healthy persons and subgroups of persons with a chronic disease

Recommended reading

Will be provided during the course

BBS3032
Period 2
29 Oct 2018
21 Dec 2018
Print course description
ECTS credits:
12.0
Instruction language:
English
Coordinators:
- R.A. de Bie
- M.R. Drost

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Paper(s), PBL, Presentations, Research, Training(s)
Assessment methods:
Assignment, Presentation
Keywords:
physical activity, assessment methods, exercise, global burden of disease, co-morbidities, mental effects of PA
Fac. Health, Medicine and Life Sciences
Critical Review of a Biomedical Intervention

Full course description

The content of the course depends on the choice of the individual student. Students choose a topic related to one of three trajectories focussing on either drug, nutritional, or physical activity interventions. The emphasis is on critically reviewing the literature on a chosen topic and related research question. The necessary knowledge and skills for this academic project were already obtained in previous courses throughout the bachelor.

A critical narrative literature review will be written in multidisciplinary groups of 3-4 students supervised by an experienced researcher (supervisor). Besides the narrative literature review, an individual and personal reflection report on the process of this project will be written as well. Students meet with their supervisor 2-3 times during this course. The supervisor finally assesses the group report, as well as the individual reflection report.

3): 101–117. DOI: 10.1016/S0899-3467(07)60142-6. Journal of Chiropractic Medicine, 5( literature review. The guidelines for such a review are based on the article of Green, B.N., Johnson, C.D. and Adams, A. (2006). Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. The focus is on writing a

Course objectives

Applying academic skills to write a narrative literature review on a self-chosen biomedical intervention.

Recommended reading

Bachelor Biomedical Sciences

Coordinators:

- A.W. Boots
- E.M.J.M. Schillings

Teaching methods:
Assignment(s), Lecture(s), Paper(s), Research

Assessment methods:
Assignment, Final paper

Keywords:
academic writing narrative review

**Educatieve Minor**

Fac. Health, Medicine and Life Sciences

**Introductie en Werkplekleren II**

EDM3001
Year
1 Sep 2018
31 Aug 2019

Print course description
ECTS credits:
13.0

Instruction language:
Dutch

Coordinators:

- J.H.J. Vernooy
- H.E. Popeijus

Fac. Health, Medicine and Life Sciences

**Didactiek en Klassenmanagement**

EDM3002
Period 1
3 Sep 2018
26 Oct 2018

Print course description
ECTS credits:
8.0

Instruction language:
Dutch

Coordinators:

- J.H.J. Vernooy
- H.E. Popeijus

Fac. Health, Medicine and Life Sciences
Vakdidactiek Biologie

EDM3005
Period 1
3 Sep 2018
1 Feb 2019
Print course description
ECTS credits: 5.0
Instruction language: Dutch
Coordinator:
  • J.H.J. Vernooy

Fac. Health, Medicine and Life Sciences

Plantfysiologie en Ecologie

EDM3006
Period 1
3 Sep 2018
21 Dec 2018
Print course description
ECTS credits: 7.0
Instruction language: Dutch
Coordinators:
  • J.H.J. Vernooy
  • H.E. Popeijus

Fac. Health, Medicine and Life Sciences

Leerlingbegeleiding en Mentoraat

EDM3003
Period 2
29 Oct 2018
23 Nov 2018
Print course description
ECTS credits: 4.0
Instruction language: Dutch
Coordinators:
  • J.H.J. Vernooy
  • H.E. Popeijus

Fac. Health, Medicine and Life Sciences
Bachelor Biomedical Sciences

**Leer- en Gedragsstoornissen**

EDM3004  
Period 3  
7 Jan 2019  
1 Feb 2019  
[Print course description](#)  
ECTS credits:  
4.0  
Instruction language:  
Dutch  
Coordinators:  
- [J.H.J. Vernooy](#)  
- [H.E. Popeijus](#)

Fac. Health, Medicine and Life Sciences

**Introductie en Werkplekleren I**

EDM3011  
Year  
1 Sep 2018  
1 Feb 2019  
[Print course description](#)  
ECTS credits:  
2.0  
Instruction language:  
Dutch  
Coordinators:  
- [J.H.J. Vernooy](#)  
- [H.E. Popeijus](#)