UNIVERSITÄT ZU LÜBECK

Module Guide for the Study Path

# Bachelor Nutritional Medicine 2018

Version from 1. October 2025

## 1st semester



## 2nd semester



## 3rd semester



## 4th semester



## 5th semester

## 6th semester

# LS1000-KP08, LS1000-MLS - Biology 1 (Bio1KP08)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 8 |

**Course of study, specific field and term:**

- Bachelor CLS 2023 (compulsory), life sciences, 1st semester
- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 1st semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 1st semester
- Bachelor MLS 2018 (compulsory), life sciences, 1st semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 1st semester
- Bachelor CLS 2016 (compulsory), life sciences, 1st semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 1st semester
- Bachelor MLS 2016 (compulsory), life sciences, 1st semester

**Classes and lectures:**

- Basic Biology (lecture, 4 SWS)
- Basic Biology (practical course, 2 SWS)

**Workload:**

- 150 Hours private studies
- 90 Hours in-classroom work

**Contents of teaching:**

- Lectures:
- Introduction
- Structure and functions of the prokaryotic cell
- Structure of the eukaryotic cells
- Selected topics of multicellular organisation
- Storage, duplication and realization of the hereditary information
- Cell cycle
- Fertilization and development
- Formal and molecular genetics, evolution
- Practical course:
- Individual testHandling of light microscopes
- Structure of prokaryotic cells
- Structure of cells from metazoan
- Human chromosomes
- Cell cycle and mitosis
- Genetics
- Bacteria

**Qualification-goals/Competencies:**

- Improvement of basic knowledge for life-science education
- Ability to understand, reproduce and use in the further studies basics of all areas listed in
- Basal practical skills in light microscopy

**Grading through:**

- written exam (test achievement)

**Responsible for this module:**

- Prof. Dr. rer. nat. Enno Hartmann

**Teacher:**

- Institute for Biology

- Prof. Dr. rer. nat. Enno Hartmann
- Prof. Dr. rer nat. Rainer Duden
- PD Dr. rer. nat. Kai-Uwe Kalies
- PD Dr. rer. nat. Bärbel Kunze

**Literature:**

- : Cambell Biology

**Language:**

- offered only in German

**Notes:**

Admission requirements for taking the module:
- None

Admission requirements for participation in module examination(s):
- Successful participation in practical course

Module exam(s):
- LS1000-L1: Biology 1, written exam, 90 min, 100% of module grade

See also HM1-10050.

## LS1100-KP10, LS1100-MLS - General Chemistry (ACKP10)

| Duration: | Turnus of offer: | Credit points: | Max. group size: |
|---|---|---|---|
| 1 Semester | each winter semester | 10 | 40 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Chemistry, 1st semester
- Bachelor Molecular Life Science 2024 (compulsory), Chemistry, 1st semester
- Bachelor MLS 2018 (compulsory), life sciences, 1st semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 1st semester
- Bachelor MLS 2016 (compulsory), life sciences, 1st semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 1st semester

**Classes and lectures:**

- General Chemistry (lecture, 3 SWS)
- General Chemistry (exercise, 1 SWS)
- General Chemistry (practical course, 4 SWS)

**Workload:**

- 180 Hours private studies
- 120 Hours in-classroom work

**Contents of teaching:**

- Lectures: Roles of Environmental and Health-Saftey and the guidelines of the GSP
- The structure of atoms and the periodic table of the elements
- Chemical bonds, molecules and Ions
- Reaction equations and stoichiometry
- The threedimensional structure of molecules: From the VSEPR model to molecular orbitals
- Special properties of water
- Chemical equilibrium
- Acids and bases
- Redox reactions and electrochemistry
- Complexes and metal-ligand bonds
- Interactions between mater and radiation - Molecular spectroscopy
- Thermodynamics
- Chemical kinetics
- Exercises:
- Students discuss problems covering all topics of the lectures on the black board
- Practical course:
- Students work self-actingly and independently with respect to the environment and occupational health and safety in the handling of hazardous materials (according to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and with regard to the rules of GSP of the University of Lübeck and of the DFG-guidelines).Topics:
- Basics principles and laboratory techniques
- Salts and their aqueous solutions
- Acids, bases and buffer
- Redox reactions
- Katalysis, metal-ligand complexes and chemical equilibrium
- Laboratory test

**Qualification-goals/Competencies:**

- Students have a fundamental knowledge of general and inorganic chemistry, as well as a primary knowledge of the properties of inorganic materials.
- They understand the fundamental concepts of general and inorganic chemistry and can apply them to reactions and general scientific topics.
- Because of their self-acting and independent work in the practical course they have fundamental practical skills to perform simple experiments and analyzes in the chemical laboratory, with respect to the environment and occupational health and safety in the handling of hazardous materials (according to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and with regard to the rules of Good Scientific Practice (GSP) of the University of Lübeck and of the DFG-guidelines).
- Students are able to perform chemical calculations from all subareas of the course.
- They are able to observe, document, interpret and present results from basic chemical experiments and analyzes (laboratory notebook, written protocol , oral examination) with regard to the roles of GSP of the University of Lübeck and of the DFG-guidelines. This includes the self-dependent handling of scientific topics with regard to their chemical backgrounds.
- They have team competence in laboratory work as well as in writing and communication.

- Students can transfer the acquired knowledge to problems of other branches in chemistry and related sciences and are thus able to participate in continuative courses.

**Grading through:**

- written exam

**Is requisite for:**

- Organic Chemistry (LS1601-KP12)
- Organic Chemistry (LS1600-KP10, LS1600-MLS)

**Responsible for this module:**

- PD Dr. phil. nat. Thomas Weimar

**Teacher:**

- Institute of Chemistry and Metabolomics

- PD Dr. phil. nat. Thomas Weimar
- Prof. Dr. rer. nat. Karsten Seeger
- Dr. rer. nat. Thorsten Biet

**Literature:**

- Brown et.al.: Chemie studieren kompakt - Pearson Studium
- Binnewies et al.: Allgemeine und Anorganische Chemie - Spektrum Verlag

**Language:**

- offered only in German

**Notes:**

Prerequisites for the modul:
- nothing

Prerequisites for admission to the written examination:
- succesful participation in the practical course with all tests.

Modul exam:
- LS1100-L1: General Chemistry, written exam, 90 min, 100% modul grade

Prerequisite for the participation in the practical course is
the participation in the general health and safety briefing.

Everybody needs the physical conditions to work independently and self-acting in the chemical laboratory.
See also HM1-10060.

## MA1800-KP05 - Basic Course in Mathematics 1 (GKMathKP05)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 5 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), mathematics, 1st semester
- Bachelor Nutritional Medicine 2018 (compulsory), mathematics, 1st semester
- Bachelor Nutritional Medicine 2016 (compulsory), mathematics, 1st semester

**Classes and lectures:**

- Basic Course in Mathematics 1 (lecture, 2 SWS)
- Basic Course in Mathematics 1 (exercise, 2 SWS)

**Workload:**

- 80 Hours private studies
- 60 Hours in-classroom work
- 10 Hours exam preparation

**Contents of teaching:**

- Convergence
- Matrices and eigenvalues
- Difference equations
- Introduction to differential and integral calculus

**Qualification-goals/Competencies:**

- Students gain insights into the topics of the course.
- Students develop an understanding of abstract thinking.
- Students are capable of solving easy problems independently and in teams.

**Grading through:**

- written exam

**Is requisite for:**

- Basic Course in Mathematics 2 (MA1850-KP04)

**Responsible for this module:**

- Prof. Dr. rer. nat. Jürgen Prestin

**Teacher:**

- Institute for Mathematics
- PD Dr. rer. nat. Christian Bey

**Literature:**

- E. Batschelet: Einführung in die Mathematik für Biologen (Titel der englischen Originalausgabe: Introduction to Mathematics for Life Scientists) - Springer
- S. Goebbels, S. Ritter: Mathematik verstehen und anwenden - Springer

**Language:**

- offered only in German

**Notes:**

Admission requirements for taking the module:
- None

Admission requirements for participation in module examination(s):
- Successful completion of exercise sheets as specified at the beginning of the semester.

Module Exam(s):
- MA1800-L1: Basic Course in Mathematics 1, written exam, 90min, 100% of the module grade.

## ME1030-KP06 - Physics (Phy)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 6 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), physics, 1st semester
- Bachelor Nutritional Medicine 2018 (compulsory), physics, 1st semester
- Bachelor Nutritional Medicine 2016 (compulsory), physics, 1st semester

**Classes and lectures:**

- Physics (lecture, 4 SWS)

**Workload:**

- 90 Hours private studies
- 60 Hours in-classroom work
- 30 Hours exam preparation

**Contents of teaching:**

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**Qualification-goals/Competencies:**

- You can name the basic laws of physics
- You can measure according to physics rules
- You can explain physical laws based on observations
- You can formally analyze physical problems
- You can judge which concept is best suited to solve a certain problem
- You can design novel physical experiments on your own

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Christian Hübner

**Teacher:**

- Institute of Physics
- Prof. Dr. rer. nat. Christian Hübner

**Literature:**

- :

**Language:**

- offered only in German

## EW1210-KP08 - Introduction into Human Biology (HB)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 8 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Nutritional Sciences, 2nd semester
- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 2nd semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 2nd semester

**Classes and lectures:**

- Human biology, course A: Anatomy and Microbiology for medical Nutritional Sciences (lecture, 3 SWS)
- Human biology, course B: Human Genetics for medicinal Nutritional Sciences (lecture, 2 SWS)
- Human biology, course B: Human Genetics for medicinal Nutritional Sciences (exercise, 1 SWS)

**Workload:**

- 150 Hours private studies
- 90 Hours in-classroom work

**Contents of teaching:**

- course Human Genetics for Nutritional SciencesIntroduction to the fundamentals and terminology of geneticsPrinciples of genetic inheritance (Traditional / Formal genetics)Construction, structure and replication of DNAIntroduction to cytogenetic, chromosomes and chromatin structureGenetic code: transcription and recombinationIntroduction to the principles of gene regulationIntroduction to Population GeneticsIntroduction to epigenetic and nutrigeneticExamples of human genetic diseases and analysis
- course Anatomy and Mikrobiologyfor Nutritional Medicine:- Terminology, basic concepts, axes, levels.- Fundamentals of histology, microscopy and staining techniques.- Basics of embryology.- Topography, skeleton (orientation lines, bone points, pulse).- Body wall (spine, diaphragm, abdominal wall, pelvis, pelvic floor).- Principles of the musculoskeletal system.- Circulatory organs / blood.- Heart, lungs, kidneys and urinary tract.- Lymphatic System, endocrine System.- Skin, glands, mucous and serous cavities generally.- The autonomic, somatic nervous system. - Oral cavity, pharynx, chewing apparatus incl. teeth. The organ of taste. - Esophagus, peritoneum, stomach, duodenum, small intestine, colon, rectum.- Liver, biliary tract, pancreas.- Skull, central nervous system, sensory organs generally, eye, ear.

**Qualification-goals/Competencies:**

- course Human Genetics for Nutritional Sciences The students can explain basic genetic principles and mechanisms of formal genetics (Mendel's laws, segregation patterns, Hardy-Weinberg principle) and correctly apply genetic terminology They can explain the formation and repair mechanism of mutations, principles of replication and recombination as well as basic mechanisms of gene regulation They can explain the principles of molecular genetics, of nutrigenomics and epigentic (DNA methylation and histone modification) They have a conceptual understanding of basic genetic problems
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- Course Anatomy for Nutritional Medicince:The students will acquire the knowledge of the specific medical jargon, which enables you to engage in interdisciplinary communication.They can designate portions of the human body with technical terms, describe their location to each other properly, and explain the functional assignment for these sections.They can explain the basic features of the histology and embryology of selected organs especially the digestive tract.They are able to describe the levels of functional systems and to detect gross pathological deviations.
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**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Tanja Zeller

**Teacher:**

- Institute of Nutrition Medicine
- Institute of Human Genetics

- Prof. Dr. med. Christian Sina
- Dr. rer. nat. Tobias Reinberger
- Dr. rer. nat. Anna Kordowski
- Prof. Dr. rer. nat. Tanja Zeller
- PD Dr. rer. nat. Yves Laumonnier

**Literature:**

- : - Lehrbücher der Anatomie und Histologie
- Cypionka: Grundlagen der Mikrobiologie. - Springer 2010
- Munk: Mikrobiologie. - Thieme 2018
- Georg Fuchs: Allgemeine Mikrobiologie - 9. Auflage

**Language:**

- offered only in German

**Notes:**

Module EW1210 consists of the two courses.
One written examination covering both parts, each valued 50%.

## EW1260-KP07 - Nutrition Physiology (EPhys)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 7 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 2nd semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 2nd semester

**Classes and lectures:**

- Nutrition Physiology (lecture, 4 SWS)
- Nutrition Physiology (practical course, 2 SWS)

**Workload:**

- 120 Hours private studies
- 90 Hours in-classroom work

**Contents of teaching:**

- Teaching content:Nutritional importance of macro- and micronutrients
- Phytochemicals
- Synthetic or natural sugar substitutes
- Digestion and absorption mechanisms of food
- Recommendations for food intake
- Basics of endocrinology
- Physiological and pathophysiological nutrition
- different Diets, alternative diets and outsider diets
- Practical course: Quantification of fat content of selected foods
- Practical course: Determination of amylase activity in vitro
- Practical course: Analyses of pepsin activity under distinct physiological conditions and its impact on proteolysis in selected foods
- Practical course: Calculation of energy demand
- Practical course: Introduction to nutrition software (EBISpro and/or DGExpert)
- Practical course: Introduction to the reference values of the DA-CH and the nutritional table of the DGE
- Practical course: Preparation of a weekly schedule that is customized to the individual energy demand

**Qualification-goals/Competencies:**

- Students are able to explain the connection between nutrition and hormones with the basics of endocrinology.
- They are able to explain the metabolism of macro- and micronutrients and thus derive their function in the maintenance of health and performance.
- They are able to assess reference values for food intake and create practical dietary recommendations on their own.
- They are able to determine the main components of foods (fat, carbohydrate and protein content).
- They will learn the critical evaluation of dietary recommendations

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. Stefanie Derer-Petersen

**Teacher:**

- Institute of Nutrition Medicine
- Prof. Dr. Stefanie Derer-Petersen

**Literature:**

- Elmadfa/Leitzmann: Ernährung des Menschen - utb, 5. Auflage, 2015
- Kasper: Ernährungsmedizin und Diätetik - Urban & Fischer Verlag/Elsevier GmbH 12. Auflage 2014
- Rehner/Daniel: Biochemie der Ernährung - Spektrum Akademischer Verlag, 3. Auflage 2010

**Language:**

- offered only in German

**Notes:**

Correct protocols are a prerequisite for the successful participation of the module.

## LS1601-KP12 - Organic Chemistry (OCEW)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 12 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 2nd semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 2nd semester

**Classes and lectures:**

- Organic Chemistry for MLS (lecture, 3 SWS)
- Organic Chemistry for MLS (exercise, 1 SWS)
- Organic Chemistry for MLS (practical course, 4 SWS)
- Natural products chemistry (lecture, 1 SWS)
- Natural products chemistry (practical course, 1 SWS)

**Workload:**

- 210 Hours private studies
- 150 Hours in-classroom work

**Contents of teaching:**

- Lecture organic chemistry:
- Alkanes, cycloalkanes, alkenes and alkynes
- Aromatics
- Stereochemistry
- Substitution and elimination reactions
- Alcohols, Phenols and Thiols
- Ether and Epoxides
- Aldehydes and ketones
- Carboxylic acids and derivativs
- Amines and derivativs
- NMR-Spectroscopy and structure analysis
- Heterocycles
- Lipids, carbohydrates, amino acids and peptides, Nucleotides and nucleic acids
- Exercises: Students discuss problems covering all topics of the lectures on the black board
- Practical course organic chemistry:
- Students work self-actingly and independently
- Equilibrium distributions and selected physico-chemical separation processes
- Threedimensional structures of organic molecules; Reaction mechanism
- Sytheses and analytical methods
- Reactions of biologically relevant molecules I
- Reactions of biologically relevant molecules II
- Quantitative determination of protein concentration with spectroscopic methods
- Lecture/lab course natural products chemistry:
- Students work self-actingly and independently
- Functional groups in natural products and their reactions
- Isolation and synthesis of natural products
- Structure elucidation of natural products

**Qualification-goals/Competencies:**

- After successful completion of the course, students have a fundamental knowledge of organic chemistry. They are confident using structural formulas of substance classes and functional groups presented in the course. They are confident in the nomenclature and can correctly describe relative and absolute configurations of molecules.
- Students know the most important reactions, reaction types and reaction principles of organic chemistry. They understand the structural properties of functional groups and are able to formulate organic chemical reaction mechanisms of these groups.
- Students acquire the principles of techniques in organic chemistry and are able to independently and self-actingly carry out simple organic reactions by following published protocols. They have a basic understanding of how to purify and analyze their reaction mixtures in order to correctly isolate and identify the desired products.
- Students have a basic knowledge of NMR spectroscopy and understand which information can be extracted from basic one and two dimensional NMR spectra. They are able to interpret simple NMR spectra and to assign the signals to the functional groups of the molecules.
- Students are capable to document and evaluate the conducted experiments using technical terms in a structured fashion. The have learned the principles of presentations and are capable of presenting chemical issues in a scientifically correct and understandable

way.
- Students can transfer and apply the acquired theoretical and practical skills to problems of other branches of chemistry and related sciences and are thus able to participate in continuative courses.
- Natural products chemsitry (lecture and lab course): Students are enabled to isolate natural products and they obtain a deeper understanding of chemical reactions and substances, especially of reactions occuring in food or the preparationof food

**Grading through:**

- written exam

**Requires:**

- General Chemistry (LS1100-KP10, LS1100-MLS)

**Responsible for this module:**

- Prof. Dr. rer. nat. Karsten Seeger

**Teacher:**

- Institute of Chemistry and Metabolomics

- PD Dr. phil. nat. Thomas Weimar
- Prof. Dr. rer. nat. Karsten Seeger
- Dr. rer. nat. Thorsten Biet

**Literature:**

- Bruice, P.Y.: Organische Chemie - Pearson Studium
- Hart, H., L.E. Craine, D.J. Hart: Organische Chemie - Wiley-VCH
- Buddrus, J.: Organische Chemie - De Gruyter Verlag
- Stefan Berger und Dieter Sicker: Classics in Spectroscopy: Isolation and Structure Elucidation of Natural Products - Wiley-VCH; Auflage: 1
- Peter Nuhn: Naturstoffchemie: Mikrobielle, pflanzliche und tierische Naturstoffe - Hirzel, S; Auflage: 4.

**Language:**

- offered only in German

**Notes:**

Prerequisites for the modul:
- LS1100-KP10 has to be passed

Prerequisites for admission to the written examination:
- succesful participation in the practical course with all tests.

Modul exam:
- LS1600-L1: Organic Chemistry, written exam, 90 min, 100 % module grade

Everybody needs the physical conditions to work independently and self-actingly in the chemical laboratory.

## MA1850-KP04 - Basic Course in Mathematics 2 (GKMathKP04)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 4 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), mathematics, 2nd semester
- Bachelor Nutritional Medicine 2018 (compulsory), mathematics, 2nd semester
- Bachelor Nutritional Medicine 2016 (compulsory), mathematics, 2nd semester

**Classes and lectures:**

- Basic Course in Mathematics 2 (lecture, 2 SWS)
- Basic Course in Mathematics 2 (exercise, 1 SWS)

**Workload:**

- 65 Hours private studies
- 45 Hours in-classroom work
- 10 Hours exam preparation

**Contents of teaching:**

- Differential and integral calculus continued
- Introduction to probability and statistics
- Introduction to differential equations and dynamical systems
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**Qualification-goals/Competencies:**

- Students gain insights into the topics of the course.
- Students develop an understanding of abstract thinking.
- Students are capable of solving easy problems independently and in teams.

**Grading through:**

- written exam

**Requires:**

- Basic Course in Mathematics 1 (MA1800-KP05)

**Responsible for this module:**

- Prof. Dr. rer. nat. Jürgen Prestin

**Teacher:**

- Institute for Mathematics
- PD Dr. rer. nat. Christian Bey

**Literature:**

- E. Batschelet: Einführung in die Mathematik für Biologen (Titel der englischen Originalausgabe: Introduction to Mathematics for Life Scientists) - Springer
- S. Goebbels, S. Ritter: Mathematik verstehen und anwenden - Springer

**Language:**

- offered only in German

## EW2310-KP05 - Nutrition Psychology (EPsy)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 5 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Nutritional Sciences, 3rd semester
- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 3rd semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 3rd semester

**Classes and lectures:**

- Nutritionpsychology (lecture, 2 SWS)
- Nutritionpsychology (exercise, 1 SWS)

**Workload:**

- 85 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

**Contents of teaching:**

- Basic psychological principles of food intake
- Empirical methods to investigate the eating behavior
- Theoretical principles of pathological nutrition
- Pre- and intervention techniques for healthy nutrition behavior
- Nutrition consulting

**Qualification-goals/Competencies:**

- Acquisition of basic concepts, theories and empirical findings of nutrition psychology
- Introduction to the empirical methods of eating behavior
- Understanding the basic and extended theories about pathological eating behavior, such as bulimia and obesity
- Understanding the basic principles of motivational psychology and learning theories and the ability to link those to the psychology of hunger, satiety and thirst
- Ability to communicate (present and discuss in groups) current empirical works

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. Stefanie Derer-Petersen

**Teacher:**

- Department of Neurology

- Prof. Dr. rer. nat. Marcus Heldmann
- Dr. rer. hum. biol. Andreas Sprenger

**Literature:**

- Christoph Klotter: Einführung Ernährungspsychologie - UTB, (2014)
- Hogrefe, Volker Pudel & Joachim Westenhöfer: Ernährungspsychologie - 3. Auflage (2003)
- : - Ausgewählte wissenschaftliche Publikationen

**Language:**

- offered only in German

**Notes:**

Admission requirements for taking the module:
- none

Admission requirements for the module examination(s):
- active participation in the exercises as specified at the beginning of the semester

Module examination(s):
- EW2310-L1: Psychology of eating behavior, written exam, 90 min, 100 % of the grade

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(share of Department of Neurology in Ü is 100%)

## EW2360-KP08 - Nutritional Medicine (ErnMed8)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 8 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 3rd semester

**Classes and lectures:**

- Nutritional Medicine (lecture, 4 SWS)
- Nutritional Medicine (seminar, 2 SWS)

**Workload:**

- 130 Hours private studies
- 90 Hours in-classroom work
- 20 Hours exam preparation

**Contents of teaching:**

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- Practical course:- Survey of nutritional status, clinical measurement techniques and anthropometry- Nutritional measurement techniques (BIA, calorimetry, etc.)Calculation and preparation of diet plans- Generation and interpretation of diet diaries- Planning parenteral nutrition- Enteral food intake- Product information of enteral & parenteral nutrition in medicine

**Qualification-goals/Competencies:**

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**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. med. Christian Sina

**Teacher:**

- Institute of Nutrition Medicine
- Prof. Dr. med. Christian Sina
- Prof. Dr. rer. nat. Martin Smollich

**Literature:**

- Biesalski, Pirlich, Bischoff, Weimann: Ernährungsmedizin - Thieme, 5. Auflage 2017
- Smollich M (Hsg.): Ernährungspraxis Senioren - Wissenschaftliche Verlagsgesellschaft. 1. Auflage Stuttgart 2020

**Language:**

- offered only in German

## LS2000-KP10 - Biochemistry 1 (Bioch1KP10)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 10 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 3rd semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 3rd semester
- Bachelor MLS 2018 (compulsory), life sciences, 3rd semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 3rd semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 3rd semester
- Bachelor MLS 2016 (compulsory), life sciences, 3rd semester

**Classes and lectures:**

- Biochemistry I (lecture, 4 SWS)
- Biochemistry I (practical course, 4 SWS)

**Workload:**

- 180 Hours private studies
- 120 Hours in-classroom work

**Contents of teaching:**

- Lectures:
- Characteristics of biosystems
- Biomolecules
- Proteins: structure and dynamics
- Enzymes: structure, function, regulation
- Metabolism of carbohydrates: Properties of carbohydrates, Functions of carbohydrates, Metabolic pathways
- Citric acid cycle
- Membrane transport and cellular respiration
- Practical:
- Biological buffer systems
- Photometric methods / hemoglobin
- Enzymatic Catalysis
- Characterization of carbohydrates
- Bioenergetics

**Qualification-goals/Competencies:**

- Students can understand structures and functions of basic biomolecules
- They can understand biochemical interrelations and their importance for cellular metabolism
- They have acquired basic knowledge of medical aspects of biochemistry
- They have acquired the basic ability to experiment independently and autonomously, taking into account environmental protection and occupational safety and the handling of hazardous substances (according to Globally Harmonized System of Classification and Labeling of Chemicals (GHS)) and the GWP guideline of the University of Lübeck in accordance with the DFG guidelines
- They can understand and apply biochemical separation and analysis methods
- They can record, interpret, quantitatively evaluate and interpret results from biochemical experiments
- They can estimate the biotechnological potential of biomolecules

**Grading through:**

- colloquiums and protocols
- written exam

**Requires:**

- Organic Chemistry (LS1600-KP10, LS1600-MLS)

**Responsible for this module:**

- Prof. Dr.  Thomas Krey

**Teacher:**

- Institute of Biochemistry

- Prof. Dr.  Thomas Krey
- Dr. Mariana Grieben

- Prof. Dr. Lars Redecke
- Dr. math. et dis. nat. Jeroen Mesters
- Dr. rer. nat. Janna Bigalke
- PD Dr. rer. nat. Guido Hansen
- Dr. rer. nat. Ksenia Pumpor

**Literature:**

- Voet/Voet: Biochemistry - 5th edition, 2018, Wiley
- Lehninger: Principles of Biochemistry - 7th edition, 2017, Freeman
- Stryer: Biochemistry - 9th edition, 2019, Freeman
- Lodish et al.: Molecular Cell Biology - 9th edition, 2021, Freeman
- Alberts et al.: Molecular Biology of the Cell - 6th edition, 2015, Garland Science

**Language:**

- German and English skills required

**Notes:**

Prerequisites for the module:
- LS1600-L1 Organic Chemistry

Prerequisites for admission to the written examination:
- None

Module exam:
- LS2000-L1: Biochemistra 1, written exam, 180 min, 70 % module grade
- LS2000-L2: Protocolle and Colloquien 30 % module grade

## MZ2200-KP06 - Physiology (PhysioKP06)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 6 |

**Course of study, specific field and term:**

- Bachelor Biophysics 2024 (compulsory), life sciences, 5th semester
- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 3rd semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 3rd semester
- Bachelor MLS 2018 (compulsory), life sciences, 3rd semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 3rd semester
- Bachelor MLS 2016 (compulsory), life sciences, 3rd semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 3rd semester
- Bachelor Biophysics 2016 (compulsory), life sciences, 5th semester

**Classes and lectures:**

- Physiology (lecture, 4 SWS)
- Physiology (seminar, 1 SWS)

**Workload:**

- 120 Hours private studies
- 60 Hours in-classroom work

**Contents of teaching:**

- Cell physiology & cell-to-cell communication
- Sensory & neuronal physiology
- Motor systems and respiration
- Cardiovascular and immune system
- Kidney physiology, electrolyte homeostasis and pH regulation
- Energy metabolism and homeostasis
- Endocrine system
- Circadian rhythms and sleep

**Qualification-goals/Competencies:**

- The students understand the cellular and molecular processes in living organisms.
- They understand the integrative processes in healthy humans.
- They are capable to interprete the physiological functions in a scientific way.

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Henrik Oster

**Teacher:**

- Institute of Neurobiology

- Prof. Dr. rer. nat. Henrik Oster
- Dr. rer. nat. Isabel Heyde

**Literature:**

- Schmidt et al.: Physiolologie des Menschen - Springer, Heidelberg
- Rhoades et al.: Medical Physiology - Lippincott Raven, Philadelphia
- Speckmann et al.: Physiologie - Elsevier, Amsterdam

**Language:**

- offered only in German

**Notes:**

Prerequisites for the modul:
- nothing

Prerequisites for admission to the written examination:
- succesful participation in the seminar

Modul exam:
- MZ2200-L1: Physiologie, written exam, 60 min, 100 % module grade

## EW2410 C - Module part C: Career Management 1: Food law (LMRecht)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 2 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (Module part of a compulsory module), interdisciplinary competence, 4th semester
- Bachelor Nutritional Medicine 2016 (Module part of a compulsory module), interdisciplinary competence, 4th semester

**Classes and lectures:**

- Food law (lecture, 2 SWS)

**Workload:**

- 30 Hours private studies
- 30 Hours in-classroom work

**Contents of teaching:**

- Sources of law and basics of food law
- Food categories and their demarcation
- Food labeling and information
- Health-Claims-regulation and additional advertising bans
- Control of food industry via competition law
- Scientific evidence supporting food effects

**Qualification-goals/Competencies:**

- The students know the basics of food law.
- They know legal basis for food labeling and food information.
- They gain an understanding on the issue of health claims regulations and other advertising bans.
- They gain an insight into the competition law and its impact on the food industry.
- They critically appreciate the legal aspects of the scientific evidence of food effects.

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Martin Smollich

**Teacher:**

- 
- Dr. Stefanie Hartwig

**Literature:**

- :

**Language:**

- offered only in German

**Notes:**

(Is part of the module EW2410-KP06)

## EW2410-KP06 - Career Management 1 (BM1)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 6 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (compulsory), interdisciplinary competence, 4th semester
- Bachelor Nutritional Medicine 2016 (compulsory), interdisciplinary competence, 4th semester

**Classes and lectures:**

- See Module part: Food technology (lecture, 2 SWS)
- See Module part: Food technology (practical course, 2 SWS)
- See Module part: Food law (lecture, 2 SWS)

**Workload:**

- 90 Hours private studies and exercises
- 90 Hours in-classroom work

**Contents of teaching:**

- see module parts EW2410 C, and EW3560 A

**Qualification-goals/Competencies:**

- see module parts EW2410 C, and EW3560 A

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Martin Smollich

**Teacher:**

- Institute of Nutrition Medicine
-
- externe Lehrbeauftragte

**Language:**

- offered only in German

**Notes:**

(EW2410 consists of EW2410 C, EW3560 A)

## EW2420-KP05 - Culture and Ethics in Nutritional Sciences (Bioethik)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 5 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2018 (compulsory), interdisciplinary competence, 4th semester
- Bachelor Nutritional Medicine 2016 (compulsory), interdisciplinary competence, 4th semester

**Classes and lectures:**

- Bioethics (lecture, 1 SWS)
- Bioethics (seminar, 2 SWS)

**Workload:**

- 75 Hours private studies and exercises
- 45 Hours in-classroom work
- 30 Hours written report

**Contents of teaching:**

- Basic terms, methods and key concerns of ethics as moral philosophy
- Significance of cultural and historical contexts for bioethics
- Social functions, politics, culture and cultural history of eating
- From dietetics to medical designer food and molecular nutrition
- Producer-consumer-relationships and the food industry
- Ethical dilemmas of product design and PR (allergies, GM)
- Social aspects of eating and nutrition (rituals, dietary rules, interculturality, identity)
- Sex and gender in nutrition (social roles, eating disorders, metabolism)
- World population, hunger and food security
- Ethics of medical dietary alternatives (diets, liquid food, infusion)
- Ethics of research with humans and animals
-

**Qualification-goals/Competencies:**

- Students can recognize and formulate ethical problems
- They understand relevant ethical aspects in their historical, social and cultural contexts
- They can apply methods of ethics to cases of nutrition sciences
- Starting from cases and examples they can recognize ethical problems and develop nuanced arguments
- They can defend ethical arguments in discussions, demonstrate them by using concrete examples and also understand and respect the counter arguments
- They can formulate the ethical rationale of a scientific trial for the research ethics committee.

**Grading through:**

- portfolio exam

**Responsible for this module:**

- Dr. phil. Birgit Stammberger
- Prof. Dr. phil. Christoph Rehmann-Sutter

**Teacher:**

- Institute for History of Medicine and Science Studies

- Prof. Dr. phil. Christoph Rehmann-Sutter
- Dr. phil. Birgit Stammberger

**Literature:**


- Stephen Mennel: Die Kultivierung des Appetits: die Geschichte des Essens vom Mittelalter bis heute - Frankfurt am Main: Athenäum, 1988.
- John S. Allen: The omnivorous mind: our evolving relationship with food - Cambridge, Mass.: Harvard Univ. Press, 2012
- H-J. Kaatsch et al. (Hg.): Ethik der Agrar- und Ernährungswissenschaften - Lit Verlag, 2008
- Gregory E. Pence (ed.): The Ethics of Food. A Reader for the 21st Century - Rowman & Littlefield, 2001
- Eva Barlösius: Soziologie des Essens. Eine sozial- und kulturwissenschaftliche Einführung in die Ernährungsforschung - 3. Auflage Beltz Juventa Verlag, 2016

- Kikuko Kashiwagi-Wetzel, Anne-Rose Meyer (ed.): Theorien des Essens - Suhrkamp, 2017

**Language:**

- offered only in German

**Notes:**

Prerequisites for the module:
- nothing

Prerequisites for admission to the written examination:
- Active participation in small group workshops as assigned at the beginning of the semester.

Module exam:
- EW2420-L1: Culture and Ethics in Nutrional Sciences, portfolio exam: a total of 50 points for reading logs, and a presentation given during the semester, and 50 points in the form of a final essay.
The grade is calculated as follows:0 to 54 points for a 4.0, then 55 to 59 points for a 3.7, then 60 to 64 points for a 3.0, then 65 to 70 points for a 2.7, then 74 to 79 points for a 2.3, then 80 to 84 points for a 2.0, then 85 to 89 points for a 1.7, then 90 to 94 points for a 1.3, and finally 95-100 points for a 1.0.

## EW3560 A - Module part: Food technology (LeMiTe)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 4 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (Module part of a compulsory module), interdisciplinary competence, 4th semester
- Bachelor Nutritional Medicine 2016 (Module part of a compulsory module), interdisciplinary competence, 4th semester

**Classes and lectures:**

- Food technology (lecture, 2 SWS)
- Food technology (practical course, 2 SWS)

**Workload:**

- 60 Hours in-classroom work
- 60 Hours private studies

**Contents of teaching:**

**Qualification-goals/Competencies:**

**Grading through:**

- written exam

**Responsible for this module:**

- Siehe Hauptmodul

**Teacher:**

- Institute of Nutrition Medicine
- Dr. Julian Huen

**Literature:**

- R. Heiss: Lebensmitteltechnologie: Biotechnologische, chemische, mechanische und thermische Verfahren der Lebensmittelverarbeitung - 6. Auflage 2003
- H. P. Schuchmann, H. Schuchmann: Lebensmittelverfahrenstechnik: Rohstoffe, Prozesse, Produkte - 1. Auflage 2005
- H. Chmiel: Bioprozesstechnik - 3. Auflage 2011
- J. Hamatschek: Eugen Ulmer KG - 1. Auflage 2016

**Language:**

- offered only in German

**Notes:**

(Is part of the module EW2410-KP06)

## LS2510-KP10 - Biochemistry 2 (Bioch2KP10)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 10 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 4th semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 4th semester
- Bachelor MLS 2018 (compulsory), life sciences, 4th semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 4th semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 4th semester
- Bachelor MLS 2016 (compulsory), life sciences, 4th semester

**Classes and lectures:**

- Biochemistry 2 (lecture, 4 SWS)
- Biochemistry 2 (practical course, 4 SWS)

**Workload:**

- 180 Hours private studies
- 120 Hours in-classroom work

**Contents of teaching:**

- Lectures:
- Structure and function of DNA and RNA
- Immunology
- N metabolism
- Amino acid metabolism
- Lipid metabolism
- Signal transduction and ho
- Practical course
- Proteins: General properties and separation methods
- Protein biosynthesis
- Polymerase chain reaction (PCR) and DNA
- Immunological methods

**Qualification-goals/Competencies:**

- Students can understand structures and functions of basic biomolecules
- They can understand biochemical relationships and their importance for cellular metabolism
- They can understand complex cell biological relationships
- They will be able to experiment independently and autonomously, taking into account environmental protection and occupational safety and the handling of hazardous substances (according to Globally Harmonized System of Classification and Labeling of Chemicals (GHS)) and the GWP guideline of the University of Lübeck in accordance with the DFG guidelines.
- They can understand and apply biochemical separation and analysis methods
- They can record, quantitatively evaluate and interpret results from biochemical experiments.
- They can correctly document and act with English technical literature
- They can estimate biotechnological potential of biomolecules

**Grading through:**

- written exam

**Requires:**

- Organic Chemistry (LS1600-KP10, LS1600-MLS)

**Responsible for this module:**

- Prof. Dr.  Thomas Krey

**Teacher:**

- Institute of Biochemistry

- Prof. Dr.  Thomas Krey
- Dr. Mariana Grieben
- PD Dr. rer. nat. Guido Hansen
- Dr. rer. nat. Janna Bigalke

- Dr. math. et dis. nat. Jeroen Mesters
- Prof. Dr. Lars Redecke
- Dr. rer. nat. Ksenia Pumpor

**Literature:**

- Voet/Voet: Biochemistry - 5th edition, 2018, Wiley
- Lehninger: Principles of Biochemistry - 7th edition, 2017, Freeman
- Stryer: Biochemistry - 7th edition, 2012, Freeman
- Stryer: Biochemistry - 9th edition, 2019, Freeman
- Lodish et al.: Molecular Cell Biology - 9th edition, 2021, Freeman
- Alberts et al.: Molecular Biology of the Cell - 6th edition, 2015, Garland Science

**Language:**

- German and English skills required

**Notes:**

Prerequisites for the module:
- LS1600-L1 Organic Chemistry

Prerequisites for admission to the written examination:
- None

Module exam:
- LS2510-L1: Biochemistry 2, written exam, 120 min, 70 % module grade
- LS2510-L2: Protocolls and Colloquim 30 % module grade

## LS2700-KP10 - Cell biology (ZellBio10)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 10 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (compulsory), cell biology, 4th semester
- Bachelor MLS 2018 (compulsory), cell biology, 4th semester

**Classes and lectures:**

- Cell biology (lecture, 3 SWS)
- Cell biology (practical course, 4 SWS)

**Workload:**

- 165 Hours private studies
- 105 Hours in-classroom work

**Contents of teaching:**

- Lectures:
- Special structure of cells
- Cell cycle and apoptosis
- Introduction into developmental biology
- Practical course (groups of 2):
- Basics in cell culture techniques
- Staining of cellular structures
- Cell fractionation and functional analysis of organelles
- Behaviour of cells during stress
- Protein pattern of apoptotic cells
- Differentiation of cells

**Qualification-goals/Competencies:**

- Principle of the basic function of the eukaryotic cells
- Detailed knowledge in all areas of cell biology covered by the lecture (see
- Basic skills to design and perform their own experiments in the area of cell biology
- Handling of basic cell biology techniques
- Improving the ability to document results correctly and to work in a team

**Grading through:**

- written exam (test achievement)

**Requires:**

- Biochemistry 1 (LS2000-KP10)
- Biology 1 (LS1000-KP06)

**Responsible for this module:**

- Prof. Dr. rer. nat. Enno Hartmann

**Teacher:**

- Institute of Medical and Marine Biotechnology
- Institute of Virology and Cell Biology
- Institute for Biology

- Prof. Dr. rer. nat. Enno Hartmann
- PD Dr. rer. nat. Kai-Uwe Kalies
- Prof. Dr. rer. nat. Charli Kruse
- Prof. Dr. rer. nat. Stefan Taube
- Dr. rer. nat. Olaf Isken
- Dr. rer. nat. Daniel Hans Rapoport
- Dr. rer. nat. Anna Emilia Matthießen
- Dr. rer. nat. Sandra Schumann

**Literature:**

- Lodish: Molecular Cell Biology

- Pollard: Cell Biology
- Wolpert: Principles of Development
- Alberts: Molecular Biology of the Cell

**Language:**

- offered only in German

**Notes:**

Prerequisites for the modul:
- nothing

Prerequisites for admission to the written examination:
- Successful participation in the internship incl. test as specified at the beginning of the semester

Modul exam:
- LS2700-L1: Cellbiology, written exam, 90 min, 100 % module grade

Knowledge in Biology 1 and 2 and Biochemistry 1 is a prerequisite for this course. Entrance requirement for the practical course: Certificate of the course Biology 1 and Biochemistry 1

(Share of Biology in V is 66,6%)
(Share of Virology in V is 33,3%)
(Share of Virology in P is 90%)
(Share of Medical and Marine Biotechnology in P is 10%)

## EC4001 T - Module part: General Business Administration, esp. Personnel Management (ABWL)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 4 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Master Entrepreneurship in Digital Technologies 2020 (Module part of a compulsory module), Module part, 1st semester
- Bachelor Nutritional Medicine 2018 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Bachelor Nutritional Medicine 2016 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Master Entrepreneurship in Digital Technologies 2014 (Module part of a compulsory module), Module part, 1st semester

**Classes and lectures:**

- General Business Administration (lecture, 2 SWS)
- General Business Administration (exercise, 1 SWS)

**Workload:**

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

**Contents of teaching:**

- Theories in business administration
- Organisational forms
- Legal forms
- Accounting basics
- Theories on leaderhip and motivation

**Qualification-goals/Competencies:**

- The students get an important and in-depth overview of the single parts of business administration.
- Within this lecture, the students are empowered to identify and classify the different theoretical areas of business administration.
- Furthermore, students will be able to evaluate the different approaches and apply them to specific situations.

**Grading through:**

- portfolio exam

**Responsible for this module:**

- Prof. Dr. Christian Scheiner

**Teacher:**

- Institute for Entrepreneurship and Business Development
- Dr. Stefan Becker

**Literature:**

- Hungenberg, Wulf: Grundlagen der Unternehmensführung - Gabler-Verlag, 4. Auflage, 2011
- Wöhe: Einführung in die Allgemeine Betriebswirtschaftslehre - Vahlen-Verlag, 24. Auflage, 2010

**Language:**

- offered only in German

**Notes:**

Prerequisites for attending the module:
- none

Prerequisites for participation in module exam(s):
- none
- Prerequisites for admission to the (written) examination may be scheduled at the beginning of the semester. When prerequisites are defined, they should be completed and positively evaluated before the initial (written) examination.

Module exam(s):
- EC4001-L1: General Business Administration, (online) tests, 100 % of module grade

(Part of Module EC4000-KP12)
(Part of Module EW3560-KP11)
(Is equal to EC4001-KP04)
(Formerly EC4001 General Business Administration)

## EC4008 T - Module part: Entrepreneurship & Innovation (EuI)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 4 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Master Entrepreneurship in Digital Technologies 2020 (Module part of a compulsory module), Module part, 1st semester
- Bachelor Nutritional Medicine 2018 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Master Entrepreneurship in Digital Technologies 2014 (Module part of a compulsory module), Module part, 1st semester

**Classes and lectures:**

- Entrepreneurship and Innovation (lecture, 2 SWS)
- Entrepreneurship and Innovation (exercise, 1 SWS)

**Workload:**

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

**Contents of teaching:**

- This course deals with fundamental theories, concepts and tools for the entrepreneurship and innovation management.
- The content is also linked to practical and current topics thus covering relevant applications.
- Individual aspects of the event will be studied on selected case studies.

**Qualification-goals/Competencies:**

- Students are able to master and apply scientific foundations and develop predominantly fundamental expertise in entrepreneurship and innovation.
- Students are able to structure and solve problems in innovation and technology management predominantly in a familiar be to some extent also even in a new, unfamiliar and multidisciplinary context.
- Students are able to define goals for their own development and reflect their own strengths and weaknesses, plan their own development and reflect the societal impact.
- Students can work cooperatively and responsibly in groups and reflect and enhance their own cooperative behavior in groups critical.

**Grading through:**

- portfolio exam

**Responsible for this module:**

- Prof. Dr. Christian Scheiner

**Teacher:**

- Institute for Entrepreneurship and Business Development
- Prof. Dr. Christian Scheiner

**Literature:**

- Nichols: Social Entrepreneurship - Oxford University Press 1. Auflage 2008
- Bessant & Tidd: Innovation and Entrepreneurship - Wiley-Verlag 2. Auflage 2013
- Fisch & Roß: Fallstudien zum Innovationsmanagement - Gabler-Verlag 1. Auflage 2009
- Bessant & Tidd: Managing Innovation: Integrating Technological, Market and Organizational Change - Wiley-Verlag: 5. Auflage 2013

**Language:**

- German and English skills required

**Notes:**

Prerequisites for attending the module:
- none

Prerequisites for participation in module exam(s):
- none
- Prerequisites for admission to the (written) examination may be scheduled at the beginning of the semester. When prerequisites are defined, they should be completed and positively evaluated before the initial (written) examination.

Module exam(s):
- EC4008-L1: Entrepreneurship and Innovation, portfolio exam, 100% of module grade

The portfolio exam consists of the following:
-Individual written assignment, 15 %
-Group work (Presentation), 45 %
-(Online)exams, 40 %

The commercial rounding is used to determine the overall grade.

(Part of Module EC4000-KP12)
(Part of Module EW3560-KP11)
(Is equal to EC4008-KP04)
(Replaces PS5830-KP04)

## EW2410 B - Module part B: Career Management 2: Quality Management (QM)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 3 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Bachelor Nutritional Medicine 2018 (Module part of a compulsory module), interdisciplinary competence, 5th semester
- Bachelor Nutritional Medicine 2016 (Module part of a compulsory module), interdisciplinary competence, 5th semester

**Classes and lectures:**

- Quality Management (lecture, 2 SWS)

**Workload:**

- 60 Hours private studies
- 30 Hours in-classroom work

**Contents of teaching:**

- basic concept of quality management
- composition and organisation of a QM-system
- Total Quality Management (TQM)
- quality system audit
- certification

**Qualification-goals/Competencies:**

- The students know the basic concept of quality management
- They understand the composition and organisation of a QM-system
-
-
-

**Grading through:**

- written exam

**Responsible for this module:**

- Siehe Hauptmodul

**Teacher:**

-

**Literature:**

- :

**Language:**

- offered only in German

**Notes:**

(Is part of the module EW3560-KP11)

## EW3501-KP05 - Research in Cell Biology and Medicine (WPEWA)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each semester | 5 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2018 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2016 (optional subject), Nutritional Sciences, 5th semester

**Classes and lectures:**

- Zellbiologisches Kolloquium (lecture, 1 SWS)
- CBBM lectures (lecture, 1 SWS)

**Workload:**

- 120 Hours private studies
- 30 Hours in-classroom work

**Contents of teaching:**

- Current results from cell biological, biochemical, biomedical and nutritional research

**Qualification-goals/Competencies:**

- Methodology applied in recent research
- Critical discussion of results
-
-
-

**Grading through:**

- continuous participation in all courses of the module
- academic paper (unmarked)

**Responsible for this module:**

- Prof. Dr. rer. nat. Martin Smollich

**Teacher:**

- Institute of Nutrition Medicine

**Language:**

- offered only in English

## EW3502-KP05 - Microbiomics (WPEWB)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 5 |

**Course of study, specific field and term:**

- Bachelor Interdisciplinary Courses for health sciences (optional subject), interdisciplinary, Arbitrary semester
- Bachelor Nutritional Medicine 2018 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2016 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2024 (optional subject), Nutritional Sciences, 5th semester

**Classes and lectures:**

- WP EW: Module part B: Microbiomics (lecture, 2 SWS)
- WP EW: Module part B: Microbiomics (seminar / exercises, 1 SWS)

**Workload:**

- 105 Hours private studies
- 45 Hours in-classroom work

**Contents of teaching:**

- Introduction to the fundamentals and terminology of system biology (Introduction of omics)
- Microorganisms on earth, microbial biodiversity, microbial consortia in natural environments and human medicine.
- Roles of microbiota in food processing (microbiota gut interaction) host (animal, human)-associated microbiota
- Methods for next generation sequencing analysis
- Analyzing the composition of microbial communities using cultivation independent approaches (microbiom sequencing)
- Bioinformatic analysis of microbiom-, genom- and transcriptome data
-
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**Qualification-goals/Competencies:**

- Microbiological topics can be discussed in the context of omics technologies
- They can classify terms like microbiome, transcriptome, proteome and metabolome properly
- They know important microbial consortia and their relevance to humans
- They know the current sequencing methods and can analyze and evaluate sequence data in the corresponding context
- The seminars and practical courses will encourage the students to deepen their knowledge within this topic and to improve their presentation skills

**Grading through:**

- continuous participation (>80%)
- presentation

**Responsible for this module:**

- Prof. Dr. med. Christian Sina

**Teacher:**

- Institute of Chemistry and Metabolomics
- Institute of Nutrition Medicine
- LIED | Lübecker Institut für experimentelle Dermatologie (Lübeck Institute of Experimental Dermatology)

- Prof. Dr. Hauke Busch
- Dr. Axel Künstner
- Prof. Dr. med. Christian Sina
- Dr. rer. nat. Anna Kordowski
- Prof. Dr. rer. nat. Ulrich Günther

**Literature:**

- David N. Fredricks: The Human Microbiota: How Microbial Communities Affect Health and Disease
- Noureddine Benkeblia: Omics Technologies: Tools for Food Science
- Sara El-Metwally: Next Generation Sequencing Technologies and Challenges in Sequence Assembly - SpringerBriefs in Systems Biology

**Language:**

- offered only in German

## EW3503-KP05 - Applied dietetics (WPEWC)

| Duration: | Turnus of offer: | Credit points: | Max. group size: |
|---|---|---|---|
| 1 Semester | each winter semester | 5 | 20 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2018 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2016 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2024 (optional subject), Nutritional Sciences, 5th semester

**Classes and lectures:**

- WP EW: Module part C: Applied dietetics (seminar, 2 SWS)
- WP EW: Module part C: Applied dietetics (exercise, 1 SWS)

**Workload:**

- 105 Hours private studies
- 45 Hours in-classroom work

**Contents of teaching:**

- Process models of nutrition counseling and their application terms.
- Selected forms of assistance and their conditions.
- Capturing, modifying and reflecting a diet protocol.
- Presentation of and dealing with nutrition software.
- Insight into the nutritional value calculation.
- Fundamentals of dietetics of selected nutrition-related diseases.
- Therapy and application-relevant content from the cooking and kitchen equipment.
- Therapy and application-relevant content of Food Science.
- Basics of communication.
- Use of the media in the dietary advice.
- Use of methods of dietary advice module name: Applied dietetics

**Qualification-goals/Competencies:**

- Reflection and editing of selected process-oriented cases in nutritional medicine.
- Planning, implementing and evaluating of selected nutritional interventions.
- Acquiring practice-relevant information in the context of a diet protocol.
- Basics of nutritional value calculation.
- Theoretical knowledge of nutrition implemented/transferred into practical and client-oriented recommendations.
- Nutritional alternatives for clients.
- Basics of communication in nutritional interventions.
- Selected media and methods for nutrition counseling.

**Grading through:**

- Oral examination

**Responsible for this module:**

- Prof. Dr. rer. nat. Martin Smollich

**Teacher:**

- Institute of Nutrition Medicine

**Literature:**

- Höfler/Sprengart: Praktische Diätetik. - Wissenschaftliche Verlagsgesellschaft Stuttgart, 2. Auflage 2018

**Language:**

- offered only in German

## EW3505-KP05 - Nutritional Medicine - Outpatient Services (WPAEM)

| Duration: | Turnus of offer: | Credit points: | Max. group size: |
|---|---|---|---|
| 1 Semester | each semester | 5 | 20 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (optional subject), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2018 (optional subject), Nutritional Sciences, 5th semester

**Classes and lectures:**

- Ambulante Ernährungsmedizin (seminar / exercises, 3 SWS)

**Workload:**

- 105 Hours private studies
- 45 Hours in-classroom work

**Contents of teaching:**

- Organization and implementation of an outpatient nutrition medical consultation.
- Pathophysiology and therapy of selected nutrition-related diseases.
- Outpatient nutrition therapy. Methodology for assessing nutritional status, interpretation of food diaries.
- Resource assessment and motivation analysis.
- Measures to improve nutrition therapy adherence.
- Basics of doctor-patient and nutrition communication.

**Qualification-goals/Competencies:**

- Students have broad and integrated knowledge in outpatient nutrition medicine as well as in the organization and practical implementation of a nutrition medical consultation.
- They possess a critical understanding of the interpretation of food diaries and reflect on nutrition communication processes in an appropriate manner.
- Students have a broad range of suitable methods for assessing complex nutrition-related contexts in an outpatient setting.
- They can explain, argue and further develop complex aspects from exemplary areas of nutrition medicine to professionals using specialized language.
- They independently define, reflect on and evaluate learning and work process goals, and can independently and sustainably design these processes.

**Grading through:**

- see Notes

**Responsible for this module:**

- Prof. Dr. med. Christian Sina

**Teacher:**

- Institute of Nutrition Medicine
- Prof. Dr. med. Christian Sina

**Literature:**

- Biesalski, Pirlich, Bischoff, Weimann: Ernährungsmedizin - Thieme, 5. Auflage 2017
- Kasper: Ernährungsmedizin und Diätetik - Urban & Fischer Verlag/Elsevier GmbH 12. Auflage 2014

**Language:**

- offered only in German

**Notes:**

The allocation of credit points and grading is done through: evaluation of a written case report, including a nutrition protocol.

## EW3510-KP08 - Food Safety (LMS)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 8 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Nutritional Sciences, 6th semester
- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 5th semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 5th semester

**Classes and lectures:**

- EW3510-V: Food safety (lecture, 4 SWS)
- EW3510-P: Food safety (practical course, 2 SWS)

**Workload:**

- 150 Hours private studies
- 90 Hours in-classroom work

**Contents of teaching:**

- 1. basics of nutritional toxicology
- 1.1 General toxicology
- 1.2 Cellular and molecular toxicology
- 1.3 Nutritional toxicological bioavailability
- 1.4 Toxicity testing and risk assessment
- 1.5 Food monitoring
- 1.6 Food supplements
- 2 Special nutritional toxicology
- 2.1 Food ingredients
- 2.2 Food additives
- 2.3 Food contaminants
- 2.4 Processing-related substances
- 2.5 Microbial risks

**Qualification-goals/Competencies:**

- Students can derive risk assessments for food safety from microbiological parameters (literature data).
- Students are able to understand and to actively apply the scientific vocabulary of basic toxicology.
- By applying their toxicological knowledge, students can autonomously carry out qualitative risk assessments of food, evaluate scientific data, critically review scientific publications and select appropriate procedures to verify working hypotheses.
- Students can explain relationships between food toxicology and food hygiene in a differentiated way and use this knowledge in the sense of a theory-practice transfer as well as in order to answer current scientific questions.
- The toxicological evaluation of relevant substances within the food production is carried out in a differentiated way and by taking methodological limitations into account.
- Students are able to assess the risks of nutrition-related toxic substances to humans and to the environment.
- For this purpose, students learn the terminology and logic of toxicology as well as the effect patterns of important substance groups.
- They can derive risk assessments from experimentally determined toxicological parameters (literature data).
- They know the reaction parameters of contaminants in food and understand legal norms from a technical point of view

**Grading through:**

- written exam

**Requires:**

- Biology 1 (LS1000-KP08, LS1000-MLS)

**Responsible for this module:**

- Prof. Dr. rer. nat. Martin Smollich

**Teacher:**

- Institute of Nutrition Medicine
- Prof. Dr. rer. nat. Martin Smollich

**Literature:**

- Bart/Ernst/Papatheodorou: Toxikologie für Einsteiger. - Spektrum Akademischer Verlag, 1. Auflage 2022

- Matissek: Lebensmittelsicherheit. - Springer Spektrum, 1. Auflage 2020

**Language:**

- offered only in German

**Notes:**

Admission requirements for taking the module:
- None (the competencies of the modules listed under Presupposes are required for this module, but are not a formal prerequisite)

Admission requirements for participation in module examination(s):
- None

Module Exam(s):
- EW3510-L1 Food safety, written exam, 120 min, 100 % of the module grade

From 2027 the module will be offered in the summer semester.

(Share of Institute of Nutrition Medicine to V is 100%)
(Share of Institute of Nutrition Medicine to P is 100%)

## EW3560-KP11 - Career Management 2 (BM2)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 11 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), interdisciplinary competence, 5th semester
- Bachelor Nutritional Medicine 2018 (compulsory), interdisciplinary competence, 5th semester
- Bachelor Nutritional Medicine 2016 (compulsory), interdisciplinary competence, 5th semester

**Classes and lectures:**

- See Module part: EC4008 T Entrepreneurship & Innovation (lecture, 2 SWS)
- See Module part: EC4008 T Entrepreneurship & Innovation (exercise, 1 SWS)
- See Module part: EC4001T General Business Administration (lecture with exercises, 3 SWS)
- See Module part: EW2410 B Quality Management (lecture, 2 SWS)

**Workload:**

- 210 Hours private studies and exercises
- 120 Hours in-classroom work

**Contents of teaching:**

- see module parts EW2410 B, EC4008 T and EC4001 T

**Qualification-goals/Competencies:**

- see module parts EW2410 B, EC4008 T and EC4001 T

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. Christian Scheiner

**Teacher:**

-
- Institute for Entrepreneurship and Business Development

- Prof. Dr. Christian Scheiner
- Dr. Stefan Becker
- Dr. Annika Schroeder

**Language:**

- offered only in German

**Notes:**

Prerequisites for attending the module:
- none

Prerequisites for participation in module exam(s):
- none
- Prerequisites for admission to the (written) examination may be scheduled at the beginning of the semester. When prerequisites are defined, they should be completed and positively evaluated before the initial (written) examination.

Module exam(s):
- EC4008-L1 Entrepreneurship and Innovation, Portfolio exam, 25% of the module grade
- EC4001-L1 General Business Administration, E-tests during the semester, 25% of the module grade
- EW2412-L1 Quality Management, written exam, 90min, 50% of the module grade

For students before WS 18/19 the module consists of EW2410 B, EC4005 T, EC4001 T. It is recommended to take the module part EC4008 T Entrepreneurship & Innovation instead of the module part EC4005 T Investment and Technology Management, since the basics are taught in EC4008 T.

To determine the overall grade, module parts EC4008 T and EC4001 T will each be graded at 25% and module part EW2410B will be graded at 50%.

(EW3560 consists of the module parts EW2410 B, EC4008 T und EC4001 T)

## LS3150-KP10 - Molecular Biology (MolBioKP10)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each winter semester | 10 |

**Course of study, specific field and term:**

- Bachelor MLS 2018 (compulsory), life sciences, 5th semester
- Bachelor Nutritional Medicine 2018 (compulsory), life sciences, 5th semester
- Bachelor Nutritional Medicine 2016 (compulsory), life sciences, 5th semester
- Bachelor MLS 2016 (compulsory), life sciences, 5th semester

**Classes and lectures:**

- Molecular Biology (lecture, 2 SWS)
- Molecular Biology (seminar, 2 SWS)
- Practical Course Molecular Biology (practical course, 3 SWS)
- Molecular Biology (exercise, 1 SWS)

**Workload:**

- 180 Hours private studies
- 120 Hours in-classroom work

**Contents of teaching:**

- Lectures:Typically, 6 coherent blocks will be lectured.
- Genetic engineering methods: vector types and cloning strategies
- Regulation of eukaryotic gene expression at the DNA level: transcription, RNA polymerases, histone code, and epigenetic processes.
- Nucleic acids: non-coding RNAs, interference RNA, CRISPR-Cas9
- Gene therapy and recombinant vaccines
- Regulation of eukaryotic gene expression at the RNA level; differential splicing of mRNA, molecular basis of the regulation of splicing and mRNA stability as well as significance for human diseases.
- Mechanisms of translation; functions of ribosomal proteins and their paralogs, specialised ribosomes and diseases caused by changes in the translational machinery.
- Exercises:Reading of scientific articles and oral presentation
- Understanding scientific contexts
- English as lingua franca in science
- Practical course (groups of 2): Handling DNA and RNA; isolation, purification, enzymatic cleavage and gel electrophoretic presentation of DNA/RNA fragments.
- Detection of gene expression at the mRNA level, ligation, transformation and selection of clones due to antibiotic resistance.
- Prokaryotic expression of a protein fragment, and its analytical identification and preparative isolation (affinity purification)
- Design of PCR-primers; specialized PCR techniques and identification of PCR products by electrophoresis
- Exercise (groups of 4):Dealing with databases, use of molecular biology computer programs, creation of restriction maps
- Computer-aided sequence analyses

**Qualification-goals/Competencies:**

- Students are able to present basic steps of genetic engineering
- They can explain basic mechanisms of gene expression
- They are able to formulate basic mechanisms of RNA-regulated biological systems
- They can present examples for the relationship between pathophysiological processes and their molecular basis
- They are able to explain principles of gene therapy
- They acquire the competence to handle english literature and to present it in a scientific oral presentation
- lab course: They have skills in basic molecular-biological techniques
- lab course: They have the basic knowledge of safety at work in molecular-biological labs
- lab course: They know the basics of scientific documentation techniques and can work in a team
- Basic skills to design and perform their own experiments
- Internship: They have basic knowledge of occupational health and safety in molecular biology laboratories
- Internship: They have the ability to document data correctly and work in a team
- They have the basic ability to experiment independently and autonomously
- They will develop additional skills in Digital Molecular Biology.

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Norbert Tautz

**Teacher:**

- Institute of Medical and Marine Biotechnology
- Department of Neurosurgery
- Institute of Virology and Cell Biology
- Institute of Molecular Medicine

- Dr. rer. nat. Olaf Isken
- Prof. Dr. rer. nat. Norbert Tautz
- PD Dr. rer. nat. Christina Zechel
- Dr. rer. nat. Rosel Kretschmer-Kazemi Far
- Dr. rer. nat. Sandra Schumann

**Literature:**

- Alberts et al.: Molecular Biology of Cells - Garland Science
- Lodish et al.: Molecular Cell Biology - Freeman
- Buchanan et al.: Biochemistry and Molecular Biology of Plants - Wiley Verlag
- Watson et al.: Molekularbiologie - Pearson Studium
- : Course script

**Language:**

- offered only in German

**Notes:**

Admission requirements for taking the module:
- None

Admission requirements for the practical course:
- Passed module LS2000-KP10 Biochemistry 1 or LS2510-KP10 Biochemistry 2

Admission requirements for participation in module examination(s):
- Successful completion of tests in the practical course during the semester

Module examination(s):
- LS3150-KP10: Molecular Biology, written exam, 90min, 100% of the module grade

(Share of Institute for Virology and Cell Biology in S is 50%)
(Share of Clinic for Neurosurgery in S is 25%)
(Share of Institute for Medical and Marine Biotechnology in S is 25%)
(Share of Institute for Virology and Cell Biology in V is 60%)
(Share of Clinic for Neurosurgery in V is 40%)
(Share of Institute for Virology and Cell Biology in practical course is 100%)
(Share of Institute for Virology and Cell Biology in practise is 100%)

## CS1020-KP05 - Introduction Into Databases and Systems Biology (EinfDBSB)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 5 |

**Course of study, specific field and term:**

- Bachelor Biophysics 2024 (compulsory), bioinformatics, 6th semester
- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 6th semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 6th semester
- Bachelor MLS 2018 (compulsory), computer science, 6th semester
- Bachelor Nutritional Medicine 2018 (compulsory), computer science, 6th semester
- Bachelor MLS 2016 (compulsory), computer science, 6th semester
- Bachelor Biophysics 2016 (compulsory), bioinformatics, 6th semester
- Bachelor Nutritional Medicine 2016 (compulsory), computer science, 6th semester

**Classes and lectures:**

- Introduction into databases and system biology (lecture, 2 SWS)
- Introduction into databases and system biology (exercise, 1 SWS)
- Introduction into databases and system biology (practical course, 1 SWS)

**Workload:**

- 75 Hours private studies
- 45 Hours in-classroom work
- 30 Hours exam preparation

**Contents of teaching:**

- Entity-Relationship-Models
- Relation algebras
- Database systems
- Structured query language
- bio-databases
- Basic terms of system biology
- Cellular networks

**Qualification-goals/Competencies:**

- Students can create databases, manage them and create complex database queries.
- They can explain the basic terms of system biology and classify them correctly.
- Students know different bio-databases and can use and access them to solve problems from bioinformatics and system biology.

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. rer. nat. Till Tantau

**Teacher:**

- LIED | Lübecker Institut für experimentelle Dermatologie (Lübeck Institute of Experimental Dermatology)
- Institute for Theoretical Computer Science

- Prof. Dr. rer. nat. Till Tantau
- Prof. Dr. Hauke Busch

**Literature:**

- Edda Klipp et al.: Systems Biology - A Textbook - Weinheim Wiley-VCH Verlag GmbH & Co. KGaA [2016]
- Sarah E Hunt et al.: Ensembl variation resources , Database Volume 2018 - doi.org/10.1093/database/bay119 T. Hubbard et al. The Ensembl genome database project., Nucleic Acids Research 2002 30(1):38-41.
- Gumm, Sommer: Einführung in die Informatik - 2012, De Gruyter Studium Kemper
- Kemper, Eickler: Datenbanksysteme: Eine Einführung - 2015, De Gruyter Studium

**Language:**

- offered only in German

**Notes:**

Prerequisites for the module:
- nothing

Prerequisites for admission to the written examination:
- succesful work on the exercises

Module exam:
- CS1020-L1: Introduction into databases and system biology, written exam, 90 min, 100 % module grade

## EW3610-KP05 - Epidemiology (Epid)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 5 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Nutritional Sciences, 6th semester
- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 6th semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 6th semester

**Classes and lectures:**

- Epidemiology (lecture, 2 SWS)
- Epidemiology (exercise, 2 SWS)

**Workload:**

- 80 Hours private studies
- 60 Hours in-classroom work
- 10 Hours exam preparation

**Contents of teaching:**

- Lecture:
- Introduction to Epidemiology
- Diagnostic
- Frequency Measurement
- Study designs (randomized controlled trials, cohort study, case-control study, cross-sectional study)
- Effect measures
- Causality
- Randomness, Bias and Confounding
- Error control
- Exercise:
- Critical reading and evaluation of original scientific papers
- Evaluation and interpretation of study results
- Preparation of a study plan

**Qualification-goals/Competencies:**

- Students can explain specific technical terms such as incidence, prevalence, mortality and lethality.
- They can explain and interpret epidemiological measures.
- They can judge which study design is considered adequate for which specific questions.
- They can judge whether the study methodology applied leads to reliable or biased results.
- They can formally analyse and critically evaluate the internal and external validity as well as the reporting quality of a scientific paper using checklists.
- They are able to evaluate data, methods and results of (nutritional) epidemiological research and scientific papers in the context of medicine and epidemiology.

**Grading through:**

- written exam

**Responsible for this module:**

- Prof. Dr. med. Alexander Katalinic

**Teacher:**

- Institute for Social Medicine and Epidemiology
- Louisa Labohm, M.Sc.
- MitarbeiterInnen des Instituts

**Literature:**

- L. Gordis: Epidemiology - Philadelphia: Saunders; 4th edition (May 14, 2008)
- :
- alternativ: L. Gordis: Epidemiology - Oxford: Elsevier: 6th edition 2019

**Language:**

- German and English skills required

**Notes:**

Prerequisites for attending the module:
- None

Prerequisites for the exam:
- None

## EW3990-KP12 - Bachelor Thesis Nutritional Medicine (BAMN)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each semester | 12 |

**Course of study, specific field and term:**

- Bachelor Nutritional Medicine 2024 (compulsory), Nutritional Sciences, 6th semester
- Bachelor Nutritional Medicine 2018 (compulsory), Nutritional Sciences, 6th semester
- Bachelor Nutritional Medicine 2016 (compulsory), Nutritional Sciences, 6th semester

**Classes and lectures:**

- Bachelor Thesis (supervised self studies, 1 SWS)
- Colloquium (presentation (incl. preparation), 1 SWS)

**Workload:**

- 360 Hours private studies

**Contents of teaching:**

-

**Qualification-goals/Competencies:**

-
-
- The students can employ appropriate methods for independently addressing a nutritional medicine/human biology research question.
-
-
- Ability to solve a preformulated simple scientific problem mostly in a defined period of time and to present the experimental results with regard to the roles of Good Scientific Practice (GSP) of the University of Lübeck and of the DFG-guidelines.

**Grading through:**

- Written report

**Responsible for this module:**

- Studiengangsleitung

**Teacher:**

- Other Institutes
- Alle prüfungsberechtigten Dozentinnen/Dozenten des Studienganges

**Language:**

- thesis can be written in German or English

## MA1600-KP04, MA1600, MA1600-MML - Biostatistics 1 (BioStat1)

| Duration: | Turnus of offer: | Credit points: |
|---|---|---|
| 1 Semester | each summer semester | 4 |

**Course of study, specific field and term:**

- Bachelor CLS 2023 (compulsory), mathematics, 2nd semester
- Bachelor Biophysics 2024 (compulsory), Elective Computer Science, 4th semester
- Bachelor Nutritional Medicine 2024 (compulsory), mathematics / natural sciences, 4th semester
- Bachelor MES 2014 (optional subject), mathematics / natural sciences, 3rd semester at the earliest
- Bachelor Computer Science 2019 (optional subject), Extended optional subjects, Arbitrary semester
- Bachelor Computer Science 2019 (compulsory), Canonical Specialization Bioinformatics and Systems Biology, 6th semester
- Bachelor Medical Informatics 2019 (compulsory), medical computer science, 6th semester
- Bachelor MLS 2018 (compulsory), life sciences, 6th semester
- Bachelor Nutritional Medicine 2018 (compulsory), mathematics / computer science, 6th semester
- Bachelor CLS 2016 (compulsory), mathematics, 2nd semester
- Bachelor CLS 2010 (compulsory), mathematics, 2nd semester
- Bachelor Computer Science 2016 (optional subject), advanced curriculum, Arbitrary semester
- Bachelor Computer Science 2016 (compulsory), Canonical Specialization Bioinformatics, 4th semester
- Bachelor MLS 2016 (compulsory), life sciences, 6th semester
- Bachelor Biophysics 2016 (compulsory), Elective Computer Science, 4th semester
- Bachelor Nutritional Medicine 2016 (compulsory), mathematics / computer science, 6th semester
- Bachelor Medical Informatics 2014 (compulsory), medical computer science, 4th semester
- Bachelor Computer Science 2014 (compulsory), specialization field bioinformatics, 6th semester
- Master MES 2011 (advanced curriculum), biophysics and biomedical optics, 2nd semester
- Bachelor Medical Informatics 2011 (compulsory), medical computer science, 4th semester
- Master Computer Science 2012 (optional subject), specialization field bioinformatics, 2nd or 3rd semester
- Master Computer Science 2012 (compulsory), advanced curriculum stochastics, 2nd semester
- Bachelor Computer Science 2012 (optional subject), specialization field bioinformatics, 6th semester
- Bachelor MLS 2009 (compulsory), life sciences, 6th semester
- Bachelor MES 2011 (optional subject), medical engineering science, 6th semester
- Bachelor Molecular Life Science 2024 (compulsory), mathematics / computer science, 4th semester

**Classes and lectures:**

- Biostatistics 1 (lecture, 2 SWS)
- Biostatistics 1 (exercise, 1 SWS)

**Workload:**

- 66 Hours private studies
- 39 Hours in-classroom work
- 15 Hours exam preparation

**Contents of teaching:**

- Descriptive statistics
- Probability theory, including random variables, density, and cumulative distribution function
- Normal distribution, other distributions
- Diagnostic tests, reference range, normal range, coefficient of variation
- Statistical testing
- Sample size calculations
- Confidence intervals
- Selected statistical tests I
- Selected statistical tests II
- Linear simple regression
- Analysis of variance (one-way-classification)
- Clinical trials
- Multiple Testing: Bonferroni, Bonferroni-Holm, Bonferroni-Holm-Shaffer, Wiens, hierarchical Testing

**Qualification-goals/Competencies:**

- With regard to the roles of GSP of the University of Lübeck and of the DFG-guidelines the student were able to work with the following statistical methods:The students are able to calculate descriptive statistics.
- They are able to calculate quantiles and surfaces of the normal distribution.
- They are able to explain terms of diagnostic testing, such as sensitivity or specificity.
- They are able to list the basic principles of statistical testing, sample size calculation and confidence interval construction.

- They are able to carry out a set of elementary statistical tests, such as t-test, test of proportions, X2 independence test, and to interpret the results.
- They are able to explain the basic principles of linear regression.
- They are able to apply the linear simple regression.
- They are able to explain the basic idea for the one-way analysis of variance (ANOVA).
- They are able to explain the results table for the one-way and two-way ANOVA.
- They are able to interpret the results of the ANOVA.
- They know the basic principles of clinical therapeutic studies.
- They know the assumptions that need to be fulfilled for the application of specific statistical tests.
- They are able to calculate simple adjustments for multiple comparisons.

**Grading through:**

- written exam

**Is requisite for:**

- Module part: Biostatistics 2 (MA2600 T)
- Biostatistics 2 (MA2600-KP07)
- Biostatistics 2 (MA2600-KP04, MA2600)

**Responsible for this module:**

- Prof. Dr. rer. biol. hum. Inke König

**Teacher:**

- Institute of Medical Biometry and Statistics

- Prof. Dr. rer. biol. hum. Inke König
- MitarbeiterInnen des Instituts

**Literature:**

- Matthias Rudolf, Wiltrud Kuhlisch: Biostatistik: Eine Einführung für Biowissenschaftler - 1. Auflage, Pearson: Deutschland
- Lothar Sachs, Jürgen Hedderich: Angewandte Statistik: Methodensammlung mit R - 15. Auflage, Springer: Heidelberg

**Language:**

- offered only in German

**Notes:**

Prerequisites for attending the module:
- None

Prerequisites for the exam:
- Active and regular participation in the exercise groups as specified at the beginning of the semester.

Module exam:
-MA1600-L1: Biostatistics 1, written exam, 90 min, 100 % of module grade