UNIVERSITÄT ZU LÜBECK

Module Guide for the Study Path

Bachelor Nutritional Medicine 2024

Version from 1. October 2024

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:

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. Henriette Kirchner

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. Henriette Kirchner
- 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-KP08 - Nutrition Physiology (EPhys8)

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

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:

- Dr. Stefanie Derer

Teacher:

- Institute of Nutrition Medicine
- Dr. Stefanie Derer

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.

LS1600-KP10, LS1600-MLS - Organic Chemistry (OCKP10)

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

Course of study, specific field and term:

- Bachelor Nutritional Medicine 2024 (compulsory), Chemistry, 2nd semester
- Bachelor Molecular Life Science 2024 (compulsory), Chemistry, 2nd semester
- Bachelor MLS 2018 (compulsory), life sciences, 2nd semester
- Bachelor MLS 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)

Workload:

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

Contents of teaching:

- Lectures:
- 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:
- Students work self-actingly and independently in a chemical laboratory with regard to the roles of GSP of the University of Lübeck and of the DFG-guidelines on the following topics:
- Equilibrium distributions and selected physico-chemical separation processes
- Threedimensional structures of organic molecules; Reaction mechanism
- Sytheses and analytical methods, e.g. ASS-Synthesis, anlytics with HPLC, LC, melting-point and NMR-spectroscopy
- Different reactions of biologically relevant molecules
- Extraction of cholesterol from chickeneggs
- Quantitative determination of protein concentration with spectroscopic methods

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 with regard to the roles of GSP of the University of Lübeck and of the DFG-guidelines.. 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.

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Grading through:

- written exam

Requires:

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

Responsible for this module:

- PD Dr. phil. nat. Thomas Weimar

Teacher:

- Institute of Chemistry and Metabolomics

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

Literature:

- Buice, 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

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:

- PD Dr. rer. nat. Dipl.-Psych. Marcus Heldmann

Teacher:

- Department of Neurology

- PD Dr. rer. nat. Dipl.-Psych. 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

EW2360-KP09 - Nutritional Medicine (ErnMed9)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	9

Course of study, specific field and term:

- Bachelor Nutritional Medicine 2024 (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. 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. Violetta Pilorz

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, 90 min, 100 % module grade

EW2410-KP07 - Career Management 1 (BM_1)

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

Course of study, specific field and term:

- Bachelor Nutritional Medicine 2024 (compulsory), interdisciplinary competence, 4th semester

Classes and lectures:

- EW2410-P: Food technology (lecture, 2 SWS)
- EW2410-V: Food technology (practical course, 2 SWS)
- EW2411-V: Food law (lecture, 2 SWS)

Workload:

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

Contents of teaching:

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- 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:

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- 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. Martin Smollich

Teacher:

- Institute of Nutrition Medicine
-
- Prof. Dr.-Ing. Arne Pietsch
- Dr. Dorotea Pein
- externe Lehrbeauftragte

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

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-KP06 - Cell biology (ZellBioKP6)

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

Course of study, specific field and term:

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

Classes and lectures:

- Cell biology (lecture, 4 SWS)

Workload:

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

Contents of teaching:

- Special structure of cells
- Cell cycle and apoptosis
- Introduction into developmental biology

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

Grading through:

- written exam

Responsible for this module:

- Prof. Dr. rer. nat. Enno Hartmann

Teacher:

- Institute of Medical and Marine Biotechnology
- Institute for Biology

- Prof. Dr. rer. nat. Enno Hartmann
- PD Dr. rer. nat. Kai-Uwe Kalies
- Prof. Dr. rer. nat. Charli Kruse

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:
-nothing

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.

LS2701-KP04 - Practical Course Cell biology (ZellBioPra)

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

Course of study, specific field and term:

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

Classes and lectures:

- Practical course in Cell biology (practical course, 4 SWS)

Workload:

- 75 Hours private studies
- 25 Hours in-classroom work

Contents of teaching:

- 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:

- Basic skills to design and perform their own experiments in the area of cell biology Handling of basic cell biology techniques
- Handling of basic cell biology techniques
- Improving the ability to document results correctly (within the roles of GSP of the UzL) and to work in a team

Grading through:

- continuous, successful participation in practical course

Requires:

- Biochemistry 1 (LS2000-KP10)
- Biology 1 (LS1000-KP08, LS1000-MLS)

Responsible for this module:

- Prof. Dr. rer. nat. Stefan Taube

Teacher:

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

- Prof. Dr. rer. nat. Charli Kruse

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:
- LS1000-L1 Biology 1, LS200-L1 Biochemistry 1 or LS2510-L1 Biochemistry 2

Prerequisites for admission to the written examination:
- succesful participation in the practical course Cell Bology

Modul exam:
-LS2700-L2: Practical course in Cell biology, ungraded practical course, 0 % module grade, has to be passed

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

CS1400-KP04, CS1400 - Introduction to Bioinformatics (EinBioinfo)

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

Course of study, specific field and term:

- Bachelor IT-Security 2016 (optional subject), interdisciplinary, Arbitrary semester
- Bachelor Nutritional Medicine 2024 (compulsory), mathematics / computer science, 5th semester
- Bachelor Molecular Life Science 2024 (compulsory), mathematics / computer science, 5th semester
- Bachelor MES 2020 (optional subject), computer science / electrical engineering, 3rd semester at the earliest
- Bachelor Computer Science 2019 (compulsory), Canonical Specialization Bioinformatics and Systems Biology, 1st semester
- Bachelor Computer Science 2019 (optional subject), Introductory Module Computer Science, 1st semester
- Bachelor MLS 2018 (compulsory), life sciences, 5th semester
- Bachelor MES 2014 (optional subject), computer science / electrical engineering, 3rd semester at the earliest
- Bachelor Computer Science 2016 (optional subject), Introductory Module Computer Science, 1st semester
- Bachelor Computer Science 2016 (compulsory), Canonical Specialization Bioinformatics, 1st semester
- Bachelor MLS 2016 (compulsory), life sciences, 5th semester
- Bachelor Medical Informatics 2014 (compulsory), medical computer science, 3rd semester
- Bachelor Computer Science 2014 (compulsory), specialization field bioinformatics, 1st semester
- Bachelor Medical Informatics 2011 (compulsory), medical computer science, 3rd semester
- Bachelor MLS 2009 (compulsory), life sciences, 5th semester
- Bachelor CLS 2010 (compulsory), specialization field bioinformatics, 5th semester
- Bachelor MES 2011 (optional subject), medical engineering science, 3rd or 5th semester
- Bachelor Computer Science 2012 (compulsory), specialization field bioinformatics, 1st semester
- Bachelor Biophysics 2024 (optional subject), computer science, 5th semester

Classes and lectures:

- Introduction to Bioinformatics (lecture, 2 SWS)
- Introduction to Bioinformatics (exercise, 1 SWS)

Workload:

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

Contents of teaching:

- Life, Evolution & the Genome
- Sequence assembly - Industrial reading of genetic information
- DNA sequence models & hidden markov models
- Viterbi-Algoritm
- Sequence alignment & dynamic programming
- Unsupervised data analysis (k-means, PCA, ICA)
- DNA microarrays & GeneChip technologies

Qualification-goals/Competencies:

- Students are able to explain the basic concepts of coding, transcription and translation of information in living beings.
- They are able to explain how a solution of the shortest common superstring problem can be estimated with a simple greedy algorithm.
- They are able to create a Markov chain or a Hidden Markov Model (HMM) for a given modelling problem.
- They are able to give examples on how to solve a problem using dynamic programming.
- They are able to implement the introduced algorithms (in Matlab)
- They are able to use unsupervised learning methods and they are able to interpret the results.
- They are able to explain basic Microarray-and DNA-Chip-Technologies.

Grading through:

- portfolio exam

Responsible for this module:

- Prof. Dr. rer. nat. Amir Madany Mamlouk

Teacher:

- Institute for Neuro- and Bioinformatics
- Prof. Dr. rer. nat. Amir Madany Mamlouk

Literature:

- H. Lodish, A. Berk, S. L. Zipursky and J. Darnell: Molekulare Zellbiologie - Spektrum Akademischer Verlag, 4. Auflage, 2001, ISBN-13: 978-3827410771
- A. M. Lesk: Introduction to Bioinformatics - Oxford University Press, 3. Auflage, 2008, ISBN-13: 978-0199208043
- R. Merkl and S. Waack: Bioinformatik Interaktiv: Grundlagen, Algorithmen, Anwendungen - Wiley-VCH Verlag, 2. Auflage, 2009, ISBN-13: 978-3527325948
- M. S. Waterman: Introduction to Computational Biology - Chapman and Hall, 1995

Language:

- offered only in German

Notes:

For students of the master programme Infection Biology, this is not a stand-alone module, but rather part of the module CS4011.

Prerequisites for attending the module:
- None

Computer Science students get a B certificate.

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
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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)

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.

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
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Grading through:

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

Responsible for this module:

- Prof. Dr. 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. 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.

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:

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- 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-KP06 - Molecular Biology (MolBioKP06)

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

Course of study, specific field and term:

- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 5th semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 5th semester

Classes and lectures:

- Lecture Molecular Biology (lecture, 2 SWS)
- Seminar Molecular Biology (seminar, 2 SWS)

Workload:

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

Contents of teaching:

- Lectures:Typically, 5 coherent blocks will be lectured.
- Basics: genetic engineering and gene regulation
- Growth and aging: molecular processes during ontogenetic differentiation, maintenance and loss of function during aging of cells and organisms
- Nucleic-acids: molecular basis, polymorphism, RNA-regulation. Diagnostic and possible therapeutic aspects
- Molecular biology of plants: molecular basis as well as economic and ecological aspects of transgenic plants and herbicide resistance
- Gene-therapeutic approaches and recombinant vaccines
- Exercises:Reading of scientific articles and oral presentation
- Conceptual design of publications

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

Grading through:

- written exam

Responsible for this module:

- Prof. Dr. rer. nat. Norbert Tautz

Teacher:

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

- Dr. rer. nat. Olaf Isken
- Prof. Dr. rer. nat. Norbert Tautz
- PD Dr. rer. nat. Christina Zechel

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
- : Versuchsanleitungen
- : Course script

Language:

- offered only in German

Notes:

Prerequisites for the module:
- nothing

Prerequisites for admission to the written examination:
- succesful participation in the seminar LS3150-S

Module exam:
- LS3150-L1: Molekular Biology, written exam, 90 min, 100 % module grade

LS3160-KP04 - Practical Course Molecular Biology (PrakMolBio)

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

Course of study, specific field and term:

- Bachelor Nutritional Medicine 2024 (compulsory), life sciences, 5th semester
- Bachelor Molecular Life Science 2024 (compulsory), life sciences, 5th semester

Classes and lectures:

- Practical Course Molecular Biology (practical course, 3 SWS)
- Exercises Molecular Biology (exercise, 1 SWS)

Workload:

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

Contents of teaching:

- Practical course (in groups of 2):Safe handling of DNA and RNA
- Detection of gene expression at the level of mRNA, ligation and transformation of plasmid DNA
- Procaryotic expression of protein and identification of isolated proteins
- Design of PCR-primers; specialized PCR techniques and identification of PCR products by electrophoresis
- Exercises:Work with databanks; using IT-program for molecular biology; forming restriction cards

Qualification-goals/Competencies:

- They have skills in basic molecular-biological techniques
- They have the basic knowledge of safety at work in molecular-biological labs
- They know the basics of scientific documentation techniques and can work in a team within the rules for GSP of the UzL.
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Grading through:

- continuous, successful participation in practical course

Requires:

- Molecular Biology (LS3150)
- Biochemistry 2 (LS2510-MLS)
- Biochemistry 1 (LS2000-MLS)

Responsible for this module:

- Prof. Dr. rer. nat. Norbert Tautz

Teacher:

- Institute of Virology and Cell Biology

- Prof. Dr. rer. nat. Norbert Tautz
- Dr. rer. nat. Olaf Isken
- MSc Danilo Dubrau

Literature:

- : - Course script

Language:

- offered only in German

Notes:

Prerequisites for the module:
- LS2000-L1 Biochemistry 1 oder LS2510-L1 Biochemistry 2

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

Module exam:
- LS3160-L1: Practical course Molekularbiology, ungraded practical course, 0 % module grade, has to be passed

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

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 toxicology
- 1.1 General toxicology: basic toxicological principles (modes of action, dose-response relationships, LADME model, receptor theory, differences between species); toxicity measurement (LD50, ED50, NOEL, NOAEL, LOEL, toxicity index, acute toxicity, chronic toxicity); transformations (abiotic transformations, biotic transformations, metabolism of metals)
- 1.2 Cellular and molecular toxicology: impairment of cellular processes and structures (disturbance of ion homeostasis, disturbance of energy production, disturbance of enzymatic processes, damage due to oxidative stress, damage of cell structures); alteration of gene expression; genotoxicity/carcinogenicity; protective cellular mechanisms
- 1.3 bioavailability in the food chain and food production: bioavailability, dispersion, persistence; accumulation in the food chain (bioaccumulation, bioconcentration, biomagnification), Minamata/Itai-Itai disease; input of pollutants into the environment
- 1.4 toxicity testing and risk assessment: methods of toxicity testing; risk assessment, risk evaluation, deduction of limit values (hazard analysis/critical control points); safety of novel foods and foods derived from genetically modified organisms (GMO)
- 2. food safety and monitoring
- 2.1 food spoilage, preservation: hygiene (food spoilage, hygienic and microbial standards); methods of food preservation, basic hygiene, self-control, quality standards
- 2.2 food monitoring: principles; data collection and evaluation; reporting obligations and publication of data
- 3. specific food toxicology
- 3.1 risks of substances: food ingredients (ethanol, methanol, alkaloids, hydrocyanic acid/cyanogenic glycosides, lectins, biogenic amines, coumarin, phytic acid, amylase trypsin inhibitors, glycyrrhizin, phytoestrogens, gossypol, myristicin, oxalic acid, salicylates, thujone, taurine, pyrrolizidine alkaloids, hypoglycine A, shellfish poisoning, fish poisoning, fungal poisoning); food additives (sweeteners, colourings, preservatives, antioxidants, glutamate); food contaminants (drug residues, pesticides, bisphenol A, heavy metals, ethoxyquin, dioxins, POP, endocrine disrupters, dioxins, PCB, dibenzofurans, microplastics, migration substances, solvents, radionuclides, irradiation products); process-related substances (PAK, HAA, nitrosamines, acrylamide, trans fatty acids)
- 3.2 microbial risks: bacteria (Listeria, Salmonella, Campylobacter, E. coli, EHEC, Shigella, Botulinum, MRE); funghi/mycotoxins (alfatoxins, Fusarium toxins, ochratoxins); viruses (noroviruses); prions and SSE; parasites (trichinosis, toxoplasmosis)

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. Martin Smollich

Teacher:

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

Literature:

- Dunkelberg/Gebel/Hartwig: Lebensmittelsicherheit und Lebensmittelüberwachung. - Wiley-VCH 2012
- Stein/Raithel/Kist: Erkrankungen durch Nahrungs- und Genussmittel - WVG 2011
- Dekant/Vamvakas: Toxikologie. - Spektrum Akademischer Verlag 2010

Language:

- offered only in German

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:

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Qualification-goals/Competencies:

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- The students can employ appropriate methods for independently addressing a nutritional medicine/human biology research question.
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- 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