Brandenburgische Technische Universität Cottbus - Senftenberg
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Brandenburgische
Technische Universität
Cottbus - Senftenberg

Modulhandbuch für den Studiengang Life Science and International Health (universitäres Profil), Bachelor of Science, Prüfungsordnung 2025

Inhaltsverzeichnis

Module 14388 Bachelor Thesis

assign to: Total Account

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14388	Mandatory

Modul Title	**Bachelor Thesis** Bachelor-Arbeit
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every semester
Credits	12
Learning Outcome	In their bachelor's thesis, students should apply their professional skills to a specific scientific question and their methodological and generic skills in relation to solving scientific/technical problems. Since the topics are often dealing with in working groups, students also deepen their social skills. When defending their thesis, their communication skills (presentation and discussion) are also required. When writing their thesis, students are encouraged to consider their topic in a larger context and to classify it systematically. They learn to assess the scientific value and benefit of their work. They also learn to ensure that the strategic direction of their work is also based on what will be sustainable and relevant in the future.
Contents	• Guided, mostly experimental processing of a complex scientific task • Accompanying study of primary literature on the research topic • Participation in literature and progress seminars of the working group • Laboratory report to establish the experimental approach for processing the task and discussion of the first results • Preparation of the written thesis (max. 50 pages) • Colloquium with oral presentation and discussion
Recommended Prerequisites	none
Mandatory Prerequisites	Admission to the Bachelor's thesis is granted to those who at the time of registration 132 LP from the modules of the first five semesters of the curriculum at the time of registration. This must all compulsory modules of the first five semesters have been completed.
Forms of Teaching and Proportion	Self organised studies - 360 hours

Teaching Materials and Literature	• Guideline to academic writing and preparing a thesis will be provided
Module Examination	Continuous Assessment (MCA)
Assessment Mode for Module Examination	The grade for the Bachelor's thesis is determined in a ratio of 75% for the written work (thesis) and 25% for the colloquium. The presentation and the discussion are equally important in the grade for the colloquium.
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	
Components to be offered in the Current Semester	No assignment

Module 14389 Bachelor Research Competence

assign to: Total Account

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14389	Mandatory

Modul Title	**Bachelor Research Competence** Forschungsprojekt Bachelor
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every semester
Credits	18
Learning Outcome	After completing the module, students are able to work on and document a specific task in a practical setting using scientific methods under supervision. This project study includes both practical laboratory and theoretical teaching content such as literature research, database use, scientific writing and presentation techniques. The research internship is therefore a central, career-oriented study phase. The students learn systematic scientific procedures, acquire skills in various methods and also in how to integrate socially into a working group. They take part in internal meetings and are able to present their scientific work and discuss results or problems constructively. They learn to plan, carry out and evaluate the experiments they discuss independently and conscientiously.
Contents	The students work on a scientific task specified by the practical institution in accordance with the experimental possibilities provided and are part of the respective working group. In addition to the concrete work on the topic, the students are expected to develop and deepen their theoretical understanding of the experimental background through regular literature work (primary literature) and to enable an appropriate presentation and discussion of the results achieved in the written work. The general rules for scientific publications in the respective field apply to the written report to be prepared on the project carried out.
Recommended Prerequisites	none
Mandatory Prerequisites	none

Forms of Teaching and Proportion	Consultation - 1 hours per week per semester Self organised studies - 525 hours
Teaching Materials and Literature	• "Basic Laboratory Methods for Biotechnology" by Lisa A. Seidman and Cynthia J. Moore - This textbook provides comprehensive coverage of basic laboratory techniques and safety procedures essential for biotechnology and other laboratory work. • further Materials are provided individually
Module Examination	Continuous Assessment (MCA)
Assessment Mode for Module Examination	Written report 60% Colloquium - Oral presentation (15 min) 30% and discussion (15 min) of the results 10% The written report should not exceed a maximum of 35 pages (including appendix). It is written in English and presented in a colloquium. The deadline for submitting the report is usually the last day of the exam in the first exam period in the summer semester.
Evaluation of Module Examination	Study Performance – ungraded
Limited Number of Participants	none
Remarks	none
Module Components	
Components to be offered in the Current Semester	No assignment

Module 13110 Basic Natural Sciences

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	13110	Mandatory

Modul Title	**Basic Natural Sciences** Grundlagen der Naturwissenschaften
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. Schmid, Reiner
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	The students • are able to understand and use the chemical vocabulary (nomenclature) • can write reaction equations • can perform stoichiometric and other chemical calculations • can use the periodic system and know its structure • understand the fundamental interrelations between structure and properties of matter • can describe the most important reaction types • know the fundamental concepts of chemical bonding • have an overview over a few important chemical elements and their compounds • apply the physical laws of the respective topics, to solve simple physical problems
Contents	**Part Chemistry** • Atoms, Molecules and Ions • Stoichiometry: Calculations with Chemical Formulas • Aqueous Reactions and Solution Stoichiometry • Chemical Equilibrium • Acid-Base Equilibria • Additional Aspects of Aqueous Equilibria • Gases • Thermochemistry • Electronic Structure of Atoms • Periodic Properties of Elements • Basic Concepts of Chemical Bonding • Molecular Structure and Bonding Theories

- Intermolecular Forces
- Electrochemistry
- Organic Chemistry - Introduction
- Bonding Theory for Hydrocarbons

Laboratory:
- Introduction into fundamental lab works
- qualitative analysis and determination of inorganic ions
- quantitative analysis (titrimetric analysis)

Part Physics
Taking examples from different fields of physics:
- Motion Along a Straight Line
- Motion in Two and Three Dimensions
- Force and Motion
- Kinetic Energy and Work
- Potential Energy and Conservation of Energy
- Linear Momentum
- Angular Momentum
- Fluids
- Oscillations
- Waves - General Properties
- Sound Waves
- Electromagnetic Waves
- Images
- Interference
- Diffraction
- Electric Current and Resistance
- Capacitance, Dielectrics

Recommended Prerequisites

School knowledge in physics, chemistry and mathematics

Mandatory Prerequisites

none

Forms of Teaching and Proportion

Lecture - 4 hours per week per semester
Exercise - 3 hours per week per semester
Laboratory training - 1 hours per week per semester
Self organised studies - 60 hours

Teaching Materials and Literature

Part Chemistry
- Brown/Lemay/Bursten: Chemistry - The Central Science (Pearson)
- Whitten/Gailey/Davis: General Chemistry (Saunders College Publishing)

Part Physics
- Halliday / Resnick / Walker: Fundamentals of Physics (WILEY)
- Giancoli: Physics for Scientists & Engineers (Pearson)

Module Examination

Prerequisite + Final Module Examination (MAP)

Assessment Mode for Module Examination

Prerequisite:
- Successful completion of the safety instructions including "check of knowledge"-test, and the subsequent practical training with a minimum score.

	Final Module Examination: • Written exam (120 min.), consisting of two equally graded parts, "Physics" and "Chemistry".
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• 228410 Lecture Physics (Basic Natural Sciences) • 228420 Lecture General Chemistry (Basic Natural Sciences) • 228411 Exercise Physics (Basic Natural Sciences) • 228421 Exercise General Chemistry (Basic Natural Sciences) • 228422 Laboratory training General Chemistry (Basic Natural Sciences) • 228424 Examination Basic Natural Sciences
Components to be offered in the Current Semester	**228410** Lecture Physics (Basic Natural Sciences) - 2 Hours per Term **228420** Lecture General Chemistry (Basic Natural Sciences) - 2 Hours per Term **228411** Exercise Physics (Basic Natural Sciences) - 1 Hours per Term **228421** Exercise General Chemistry (Basic Natural Sciences) - 2 Hours per Term **228422** Practical training Laboratory training General Chemistry (Basic Natural Sciences) - 1 Hours per Term **228424** Examination Basic Natural Sciences

Module 14018 Introduction to Scientific Work

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14018	Mandatory

Modul Title	**Introduction to Scientific Work** Einführung in das wissenschaftliche Arbeiten
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Dr. rer. nat. Braune, Steffen
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	This module teaches the basics of scientific work that are relevant for the courses of study at the Institute of Biotechnology. Students who have taken part in the module are able to: • apply learned strategies for literature research independently and effectively, • apply the knowledge acquired for the effective acquisition and processing of information to a literature search carried out, • apply copyright principles and correct citations to their own work, • apply the skills learned in work organisation and time management to their own work, • independently develop a project schedule from a given task, • apply the knowledge gained about the content and structural requirements in the preparation of their own graduation projects, • independently create and critically evaluate parts of a scientific work, develop a presentation on a given topic with the help of the acquired knowledge on content and structural requirements, • use the presentation techniques learned during the presentation
Contents	• Literature research and processing (search strategies, database search, citation styles, analysis of literature sources, literature management, conducting literature research as an exercise) • Work organisation and time management • Preparation of a scientific paper (structure, content requirements, form and typography, drafting of parts of a scientific paper) • Presentation techniques (structure and content of the presentation, foil design, presentation style, performance of a presentation)

Recommended Prerequisites	Basic knowledge in scientific work including Experience from the Introduction to Laboratory Work course
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Seminar - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	Seminar script Further references will be given at the beginning of the seminar.
Module Examination	Continuous Assessment (MCA)
Assessment Mode for Module Examination	• Partial performance: Exercise on "Literature research and processing" (33 %) • 2nd part: Exercise on the topic "Preparation of a scientific paper" (33 %) • 3rd part: Lecture with discussion on the topic "Presentation techniques", duration 8 minutes (34 %)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	Seminar Introduction to scientific Work
Components to be offered in the Current Semester	No assignment

Module 14102 Biomedical Data Science

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14102	Mandatory

Modul Title	**Biomedical Data Science** Biomedizinische Datenwissenschaften
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	The studies aim to provide an interdisciplinary education, combining medicine, computer science, and data analysis skills. Students learn to work with small exemplary real world datasets from biomedical research. The goal is to enable graduates to derive new knowledge, more accurate diagnoses, and improved therapies by connecting different areas of expertise. Upon completing the Bachelor course, students will be able to: • Apply statistical concepts and methods to analyse and interpret biomedical data, including hypothesis testing, regression, and machine learning. • Use bioinformatic tools and databases to analyse and interpret genomic, proteomic, and other types of biomedical data. • Program in R or Python to perform data analysis, visualization, and modelling tasks, including data wrangling, data visualization, and statistical modeling. • Use markup languages (YAML, Markdown, ECMAScript) to document and communicate biomedical data analysis results. • Apply data exchange formats (JSON, XML) to import, export, and manipulate biomedical data. • Use LaTeX to create professional-quality documents and reports for biomedical data analysis results. • Integrate multiple data sources and formats to perform comprehensive biomedical data analysis. • Evaluate the quality and limitations of biomedical data and develop strategies for data validation and quality control. • Communicate complex biomedical data analysis results effectively to diverse audiences, including healthcare professionals, researchers, and policymakers.

	• Learn about ethical and legal principles to biomedical data analysis, including issues related to data privacy, security, and informed consent. Overall, biomedical data science programs provide a broad foundation in medicine, informatics, and data analysis methods, with opportunities to deepen knowledge.
Contents	Part 1: Introduction to Biomedical Data Science Part 2: Programming for Biomedical Data Analysis Part 3: Bioinformatic Analysis of Biomedical Data Part 4: Data Exchange Formats and Markup Languages Part 5: Data Visualization and Communication Part 6: Biomedical Data Integration and Validation Part 7: Special Topics in Biomedical Data Science
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Introduction to Biomedical Data Science" by Robert Hoyt and Robert Muenchen
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	online lecture
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	**210930** Lecture Biomedical Data Science - 4 Hours per Term **210931** Examination Biomedical Data Science

Module 14103 General Biology

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14103	Mandatory

Modul Title	**General Biology** Allgemeine Biologie
Department	Faculty GW - Faculty of Health Sciences Brandenburg
Responsible Staff Member	Prof. Dr. rer. nat. habil. von Maltzahn, Julia
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	After participating in the module events, students have basic knowledge of: • the systematics, taxonomy and phylogeny of organisms, as well as the function and distribution in habitats, food chains and material cycles • the terms and theories of biodiversity; ecosystem services, origin, mechanisms of threat, protection and importance for humans as a core global task of the future • the structure and function of cell and tissue science • the structure and function of genetics (classical genetics, transcription control, cell division) • basic molecular knowledge of the most important classes of natural substances, structure and function of biomolecules • research, presentation and discussion of selected publications and formats of current, subject-related topics in seminars, individual presentations and group work
Contents	• The module teaches the basics in the areas of biodiversity, systematics and ecology; cell biology and histology; the basics of genetics; molecular structure and natural product chemistry. • The module includes the teaching of the following technical content: • Taxonomy and phylogeny, structures and functional aspects of selected pro- and eukaryotic microorganisms, fungi, plants and animal groups from protists to vertebrates • Basics for understanding abiotic and biotic factors that significantly determine the distribution and diversity of organisms and the structure of ecosystems

	• Basic mechanisms of organismic interaction and adaptation, food chains, material cycles • Molecular structures from atomic structure to the molecular building blocks of complex biomolecules are presented in order to then explain the biotechnological basics of phenotypic and genotypic biodiversity. These basics serve as a prerequisite for describing the occurrence, physiology and metabolism of pro- and eukaryotes.
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	"Campbell Biology" by Jane B. Reece; Lisa A. Urry; Michael L. Cain; Steven A Wasserman; Peter V. Minorsky
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	online lecture
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	**210932** Lecture General Biology - 4 Hours per Term **210933** Examination General Biology

Module 14104 Biomedical Information Science

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14104	Mandatory

Modul Title	**Biomedical Information Science** Biomedizinische Informationswissenschaften
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	The module include practical projects in biomedical informatics and data science to apply the learned concepts. It also covers ethical aspects and responsible handling of working with medical data. Upon completing the Bachelor course students will be able to • Understand the fundamental concepts and principles of biomedical information science, including the structure and function of biological systems, and the role of information technology in healthcare. • Analyze and interpret biomedical data (e.g., genomic, proteomic, and imaging data) using computational tools and statistical methods. • Fundamentals of design and develop healthcare information systems, including electronic health records, telemedicine systems, and personalized medicine applications. • Apply data mining and get introduced to machine learning techniques to biomedical data to identify patterns, predict outcomes, and inform decision-making. • Evaluate the effectiveness and efficiency of healthcare information systems, including their impact on patient outcomes, healthcare costs, and healthcare quality. • Communicate complex biomedical information effectively to diverse audiences, including healthcare professionals, patients, and policymakers. • Apply ethical and legal principles to the design, development, and deployment of healthcare information systems, including issues related to data privacy, security, and informed consent.
Contents	Part 1: Introduction to Biomedical Information Science Part 2: Biomedical Data Analysis Part 3: Healthcare Information Systems

	Part 4: Data Mining and Machine Learning in Biomedicine Part 5: Evaluation of Healthcare Information Systems Part 6: Ethics and Policy in Biomedical Information Science Part 7: Communication and Collaboration in Biomedical Information Science
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Introduction to Biomedical Data Science by Robert Hoyt and Robert Muenchen • Data Handling and Analysis (Fundamentals of Biomedical Science) by Andrew Blann, second edition
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequisite: • Project Presentation (in pairs, 15 min) and report (every individual, around 20 pages) ungraded Final Modul Examination: • written exam (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	online lecture
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	**210934** Lecture Biomedical Information Science - 4 Hours per Term **210935** Examination Biomedical Information Science

Module 14105 Microbiology

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14105	Mandatory

Modul Title	**Microbiology** Mikrobiologie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. habil. Stahmann, Klaus-Peter
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	After completing the module, students have an overview of the basics of microbiology. They have knowledge of the structure, lifestyle and interactions of the three groups of microorganisms: Bacteria, Archaea and Fungi, as well as the basics of virology and the importance of microorganisms in nature and society. The lecture specifically teaches and promotes scientific language skills. Through active participation, students have the opportunity to reflect on the teaching content they have already learned and to optimize their learning strategies. After completing the module, students will be able to explain and apply the scientific principles (including partial specialisations) of microbiology and will have acquired specialist knowledge, skills in self-organisation and communication skills.
Contents	• Starting from cell chemistry and the cell as the basic unit of all organisms, the properties of pro- and eukaryotic cells are demonstrated using the example of bacteria, archaea and fungi. • The treatment of the living conditions of microorganisms creates the conditions for targeted handling in the laboratory, under technical conditions and in everyday life. The role of viruses as non-cellular particles made of structured biomolecules in the context of known and new infectious diseases as well as molecular biotechnology is worked out. • Selected examples of the technical use of microorganisms provide an insight and outlook into current and future areas of work in microbial biotechnology.
Recommended Prerequisites	Modul 14103 - General Biology

Mandatory Prerequisites	none
Forms of Teaching and Proportion	Seminar - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Microbiology: An Evolving Science" by Michael T. Madigan, John M. Martinko, and David Stahl - A comprehensive textbook covering the principles and applications of microbiology. • "Microbiology: A Laboratory Manual" by Michael J. Leboffe and Burton E. Sobel - A practical manual for microbiology laboratory courses, covering techniques and procedures.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written Examination 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start from summer semester 2026!
Module Components	Seminar/ 4 SWS
Components to be offered in the Current Semester	No assignment

Module 14108 Basics in Theoretical Medicine

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14108	Mandatory

Modul Title	**Basics in Theoretical Medicine** Grundlagen Theoretischer Medizin
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	After completing the module, the students will be able to describe the following topics theoretically and explain them using specimens: • Expertise in basics of anatomy and physiology • Independently deepening and elaborating on complex medical topics
Contents	• the blueprint of the human body • the general anatomy of the active and passive musculoskeletal system • the microscopic and macroscopic basics of neuroanatomy • the morphological basics of the circulatory systems • the basic tissues of the human body: epithelial tissue, connective and supporting tissue, nervous tissue, blood
Recommended Prerequisites	13110 Basic Natural Science
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Guyton and Hall Textbook of Medical Physiology" by John E. Hall - This comprehensive textbook covers human physiology and is widely used in medical education. • "Molecular Biology of the Cell" by Bruce Alberts et al. - Covers cellular and molecular biology fundamentals relevant to medicine. • "Gray's Anatomy for Students" by Richard Drake, A. Wayne Vogl, and Adam W.M. Mitchell - An essential anatomy textbook with detailed illustrations.
Module Examination	Final Module Examination (MAP)

Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	The teaching is carried out externally by Prof. Roland Reinehr, EEK, Herzberg.
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14109 Biochemistry

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14109	Mandatory

Modul Title	**Biochemistry** Biochemie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. habil. Stohwasser, Ralf
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	Upon successful completion of this module, students will be able to: • Demonstrate a comprehensive understanding of key biochemical concepts, including metabolism, enzymology and signal transduction, and apply this knowledge to interdisciplinary research problems. • Develop analytical skills: Independently formulate strategies to solve complex biochemical problems by integrating bioanalytical techniques with basic biochemical principles. • Apply critical thinking in analysing and discussing biochemical processes from different perspectives and the ability to think critically about scientific concepts and their applications in biotechnology. • Collaborate effectively through group discussions and communicate and collaborate in a research-orientated environment. • Apply practical knowledge and link theoretical knowledge to real-world applications of biochemistry.
Contents	• Biomolecules (cell biological and chemical principles) • Lipid Biochemistry (Biomembranes and transport mechanisms) • Protein Biochemistry and Enzymatics (Structure and function of proteins) • Carbohydrate Metabolism • Tissue Metabolism and Regulation • Lipid Metabolism (Processes of lipolysis, β-oxidation, and fatty acid synthesis) • Signal Transduction Pathways and Pathobiochemistry

	• Bioanalytics (Occupational safety protocols & central methods utilized in laboratory)
Recommended Prerequisites	14103 General Biology
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Nelson, Cox (2008) Lehninger Principles of Biochemistry 5th Edition • "Marks' Basic Medical Biochemistry: A Clinical Approach" by Michael Lieberman and Alisa Peet
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14113 Biomedicine

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14113	Mandatory

Modul Title	**Biomedicine** Biomedizin
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan Prof. Dr. rer. nat. habil. von Maltzahn, Julia Prof. Dr. rer. nat. habil. Rossol, Manuela
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	Study in detail the basic scientific foundations required to practice biomedicine. • Understand the principles of biology, chemistry, and physics. • Develop critical thinking and problem-solving skills. • Communicate scientific knowledge effectively. Upon completing the course "Biomedicine", students will be able to: 1. Understand the fundamental principles of human biology and disease, including the structure and function of cells, tissues, and organs. 2. Explain the causes and mechanisms of major human diseases, including genetic, environmental, and lifestyle factors. 3. Describe the principles of pharmacology and toxicology, including the mechanisms of drug action and the effects of toxins on the human body. 4. Apply knowledge of biostatistics and epidemiology to understand the distribution and determinants of health and disease in populations. 5. Analyze and interpret biomedical data, including laboratory tests and medical imaging, to diagnose and manage diseases. 6. Evaluate the evidence-based practice of medicine, including the design and interpretation of clinical trials. 7. Communicate complex biomedical information effectively to diverse audiences, including healthcare professionals, patients, and policymakers.

	8. Develop critical thinking and problem-solving skills, while being able to Communicate scientific knowledge effectively.Apply ethical and legal principles to biomedical research and practice, including issues related to informed consent, confidentiality, and intellectual property.
Contents	This module include various aspects of molecular and cellular biology, as well as medical sciences.It teaches the basics of: • Immunology • Introduction to human disease, including genetic, environmental, and lifestyle factors • Protein biochemistry and bioinformatics • Molecular and cellular biology • Anatomy and physiology • Biochemistry • Genetics • Introduction to pharmacogenomics and personalized medicine and Principles of pharmacology, including drug action and metabolism
Recommended Prerequisites	Modul 14108 - Basics in Theoretical Medicine
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Molecular Biology of the Cell" von Bruce Alberts et al. - comprehensive standard textbook for molecular biology and cell biology
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start of the module in summer semester 2026!
Module Components	• Lecture
Components to be offered in the Current Semester	No assignment

Module 14119 Organic Chemistry

assign to: Basics in Health and Natural Sciences

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14119	Mandatory

Modul Title	**Organic Chemistry** Organische Chemie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. habil. Kaiser, Alexander
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	After participating in the module, students are able to: • Identify classes of substances based on their functional groups, • Recognize and formulate functional groups, • Describe an organic compound in terms of constitutive, configurational and conformational aspects, • Classify reaction types and mechanisms of organic chemical reactions in a classification scheme, • Formulate reaction equations and mechanisms of organic chemical reactions, • Assign physical and chemical properties and reaction options to a class of substances, • Discuss different mechanisms for a given reaction and assign a specific mechanism to it, • Identify and discuss steric and electronic factors influencing reactivity and, based on this, make a reactivity assessment, • Formulate statements about the biochemical significance of a functional group and its reactions. • The students have acquired personal skills related to the course through communicative discussion in exercises and seminars.
Contents	Terms and definitions, history of organic chemistry, the special position of carbon among the elements, hydrocarbons: alkanes, alkenes, alkynes and aromatic hydrocarbons, bonding relationships of carbon, nitrogen and oxygen atoms, principles of reaction mechanisms, classification of organic chemical reactions, polar substituent effects, additions to CC multiple bonds, halogenated hydrocarbons, alcohols, thiols, phenols, eliminations, nucleophilic substitution on the saturated C atom, ethers, thioethers, amines, aldehydes and ketones, nucleophilic additions to

	the carbonyl group and their subsequent reactions, carboxylic acids and functional carboxylic acid derivatives, nucleophilic substitution on the acyl carbon, oxidation and reduction reactions of organic compounds, stereochemistry, chemistry of carbohydrates, aminocarboxylic acids, electrophilic substitution on aromatics, radical substitution
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Organic Chemistry at a Glance, Harwood, Laurence M. / McKendrick, John E. / Whitehead, Roger, ISBN: 978-0-86542-782-2, John Wiley & Sons
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start of the study programme from the winter semester 2025/26!
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 12769 Molecular Biotechnology and Society

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	12769	Mandatory

Modul Title	**Molecular Biotechnology and Society** Molekulare Biotechnologie in der Gesellschaft
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. habil. Küpper, Jan-Heiner
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	This highly interdisciplinary lecture should demonstrate the students that many recent biotechnological developments do not only influence scientific fields, but can also have a clear-cut impact on the whole society. The students learn about biotechnological fields which are relevant for political & ethical issues, medical issues and economical issues, i.e. emerging biotechnological industries. Since biotechnology is a rather broad field, the lecture highlights some “prominent” examples. The lecture is called “Molecular Biotechnology” because of its further focus on molecular principles used in the presented biotechnological fields. For each biotechnological topic, the molecular basics are presented followed by presentation of their respective influences on politics, medicine and / or economy. If applicable, the lecture also covers some basics on relevant “Biotech” laws. The students should learn that although the awareness and knowledge of Biotechnology in society is quite low, it definitely is a key technology of the 21th century influencing many aspects of life. In addition, the students should obtain a deep understanding of the molecular principles presented in the lecture to be competent for future discussions outside the University. In addition to specialized knowledge (professional competences), the students will train social competences because of being stimulated for contributions and critical discussions. Methodical competences are developed as well because students have to use different sources to collect informations and facts (e.g. text books, internet searches, peer-reviewed journals, newspapers).
Contents	The lecture starts with an introduction into the awareness of people towards biotechnology, importance of biotechnology for medicine &

	sustainable industry, provide examples of the biotechnological presence. In addition, the lecture contains the following topics: • Forensic DNA science, their techniques, ethical issues and their national regulations (e.g. German DNA Analysedatei) • Medical DNA screening including techniques of genetic tests, examples of single gene disorders and chromosomal disorders, regulations such as the German “Gendiagnostikgesetz” • Special lectures are provided on cell cycle regulation, **Signal Transduction**, cellular mortality/immortality and molecular carcinogenesis to provide the basis for understanding the molecular defects of the discussed diseases and their respective diagnostics. • Stem cells and cloning, including stem cell biology, therapeutic and reproductive cloning, preimplantation diagnostics and their discussions in society as well as national regulations such as the German “Embryonenschutzgesetz”. • Concepts of Personalized Medicine • Biotechnology and Global Warming: This last part of the lecture makes the focus on recent developments in biotechnology that could help to mitigate global warming
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 2 hours per week per semester Seminar - 2 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Molecular Biology of the Gene, Watson et al., Pearson International Edition, Sixth Ed (2008) or newer ones • Genetik, Klug et al., Pearson Studium, 8. Auflage (2007) or newer ones • Molecular Biology of the Cell, Alberts et al., Garland Science, 5th edition (2008) or newer ones • Selected original scientific journal articles and reviews on the fields discussed.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written Examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	"Recommended Placement in the Study Plan" • Biotechnology (Master of Science, 3 Semester Version): Master 1st year course • Biotechnology (Master of Science, 4 Semester Version): Master 2nd year course
Module Components	• Lecture "Molecular Biotechnology and Society" • Seminar "Molecular Biotechnology and Society" • Examination "Molecular Biotechnology and Society"

Components to be offered in the Current Semester	**211030** Lecture Molecular Biotechnology and Society - 2 Hours per Term **211035** Seminar Molecular Biotechnology and Society - 2 Hours per Term **211038** Examination Molecular Biotechnology and Society

Module 14106 International Public Health

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14106	Mandatory

Modul Title	**International Public Health** Internationales öffentliches Gesundheitswesen
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. phil. Bilz, Ludwig Prof. Dr. Spallek, Jacob Prof. Dr. rer. medic. Kopkow, Christian
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	The students • conduct meetings and conflict moderations in a structured and goal-oriented manner • manage group dynamic processes appropriately • describe the basics of business management • discuss the advantages and disadvantages of company forms • explain the basics of managing and controlling care and support processes in care facilities • discuss the basics of controlling • analyze different types of financing and concepts
Contents	• Human resources management • Human resources development • Moderation techniques • Corporate culture in healthcare facilities (corporate mission statement vs nursing mission statement • Group dynamic processes and conflict moderation • Basics of special business administration for healthcare companies (strategic/operational controlling, management of internal processes, introduction of marketing, balance score card as a management tool • Legal basis and financing of nursing services (PKMS, Plaisir, KSHG, PSG I, II, II) • Types of companies in the healthcare industry (NGO, GmbH, AG, etc.)
Recommended Prerequisites	none

Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "International Public Health: Diseases, Programs, Systems, and Policies" edited by Michael H. Merson, Robert E. Black, and Anne J. Mills - A comprehensive overview of public health issues, programs, and policies from a global perspective. • "Global Health 101" by Richard Skolnik - An introductory textbook covering the key areas of global health, including determinants of health, disease burden, and health systems.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start fom summer semester 2026!
Module Components	• Lecture
Components to be offered in the Current Semester	No assignment

Module 14110 Health Promotion and Disease Prevention

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14110	Mandatory

Modul Title	**Health Promotion and Disease Prevention** Gesundheitsförderung und Krankheitsprävention
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	Upon successful completion of this module, students will be able to: • Conveying the basics and strategies, as well as understanding the differences and overlaps between disease prevention and health promotion • Knowledge of the concepts of primary, secondary, tertiary and quaternary prevention • Ability to plan and implement measures to improve health at the individual and population level
Contents	1. Understanding the Foundations of Health Promotion and Disease Prevention 2. Exploring Primary Prevention Techniques to Avoid Disease Manifestations 3. Implementing Secondary Prevention for Early Disease Detection 4. Tertiary and Quaternary Prevention: Managing Existing Conditions and Ethical Considerations 5. Developing Effective Health Promotion Strategies to Strengthen Individual Resources 6. Addressing the Prevention of Non-Communicable Diseases Through Lifestyle Interventions 7. Planning, Implementation and Evaluation of Effective Prevention Programmes
Recommended Prerequisites	none
Mandatory Prerequisites	none

Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Health Promotion: Foundations for Practice" by Maggie Davies and Wendy Macdowall - A comprehensive textbook covering the principles, strategies and settings for health promotion. • "Introduction to Public Health" by Mary-Jane Schneider - Includes sections on health promotion and disease prevention approaches at the population level. • "Oxford Textbook of Public Health" edited by Roger Detels et al. - A definitive reference work with detailed chapters on health promotion and disease prevention concepts and interventions.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	The teaching is carried out externally by HC Ranja, MD, PhD.
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14111 Economics of Health Systems

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14111	Mandatory

Modul Title	**Economics of Health Systems** Ökonomie der Gesundheitssysteme
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	The teaching is carried out externally by Dr. David Rutstein SolHealth, USA The aim is to understand health economics relationships and to weigh up efficiency and costs. In addition to health economics, management, quality assurance, decision theory and cost-benefit analysis are also taught. **Ethical perspective** In addition to economic goals, the focus is on questions of justice and equality in the health care system. Health economists must find the balance between economic and ethical aspects. Overall, it is clear that health economics is an interdisciplinary field that deals with the efficient and ethically justifiable allocation of scarce resources in the health care system. Interdisciplinary course offering that combines business and economics, social sciences and medical informatics.The module ‘Economics of Health Systems’ offers a comprehensive introduction to the fundamentals of health economics. Students learn to weigh up the relationships between health economics, efficiency and costs. This module prepares students to master the complex field of health economics by balancing economic efficiency with ethical and social considerations.
Contents	**Deals with core aspects of health economics:** • the scarcity of resources in the health care system and how to deal with it • Applies economic methods and theories to the health care system, e.g. supply and demand of health services

	• Analyzes the efficiency and cost-effectiveness of the use of health resources • Considers the tension between medical effectiveness and cost-effectiveness • Deals with questions of quality and fair distribution of health services
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Health Economics" by Charles E. Phelps - A standard textbook that provides a comprehensive overview of the fundamentals of health economics, including the analysis of supply and demand in the healthcare sector. • "The Economics of Health and Health Care" by Sherman Folland, Allen C. Goodman, and Miron Stano - Covers the application of economic concepts to healthcare and health policy issues.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	online lecture
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	**210936** Lecture Economics of Health Systems **210937** Examination Economics of Health Systems

Module 14112 Law in Life Science and Public Health

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14112	Mandatory

Modul Title	**Law in Life Science and Public Health** Recht in Biowissenschaften und Gesundheitssystemen
Department	Faculty 5 - Business, Law and Social Sciences
Responsible Staff Member	Prof. Dr. jur. Albrecht, Eike
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	The students know and are familiar with medical law as an interdisciplinary cross-sectional subject that is structured and influenced by different legal areas and higher-ranking legal requirements. They know common legal and medical terminology and can use it safely. The different legal and medical prior knowledge will have been aligned in the basic lectures. The students have acquired initial methodological skills so that they can subsume facts and work on simple tasks. They sre sensetive to ethical questions and know that facts must not only be assessed from a legal perspective, but also against the background of different cultural, religious and ethical value systems.
Contents	• Introduction to the field of medical law • Conceptual and constitutional foundations of medical law • Medical ethics/ethical foundations of medical law • European legal foundations of medical law
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• The Law and Economics of Public Health by Frank A. Sloan - This book provides an overview of the legal and economic aspects of public health, including the regulation of healthcare systems and the impact of law on public health outcomes
Module Examination	Final Module Examination (MAP)

Assessment Mode for Module Examination	• written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Lecture / 4 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14406 Economics

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14406	Mandatory

Modul Title	**Economics** Volkswirtschaftslehre
Department	Faculty 5 - Business, Law and Social Sciences
Responsible Staff Member	Prof. Dr. oec. habil. Schnellenbach, Jan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	After successfully completing this module, students will be able to: • Explain key economic concepts, theories, and methods relevant to life sciences and international health, including the principles of microeconomics, macroeconomics, and environmental economics. • Analyze the economic dimensions of societal problems, including environmental degradation, resource depletion, and health disparities, using economic tools and frameworks. • Apply economic approaches to develop innovative solutions to real-world problems in life sciences and international health, taking into account the social, environmental, and economic implications of different policy interventions. • Evaluate the effectiveness of economic policies and interventions aimed at addressing environmental and health challenges, using data and evidence-based reasoning. By the end of this module, students will have gained a comprehensive understanding of how economic principles can be applied to address complex problems in life sciences and international health, and will be able to think critically about the economic dimensions of these challenges.
Contents	• (Life Science and international health) forces of demand and supply • Markets, welfare and government intervention in conjunction with the life science and international health • Market failure and public policies • Costs of production and firms in competitive markets with examples for life science and international health • Monopoly and oligopoly

	• Economics of labour markets • Externalities, Cost and Pigou • Economic analysis of environmental policy instruments • Risk and its regulation • Feed and tariffs • Economics of renewable and non-renewable resources
Recommended Prerequisites	None
Mandatory Prerequisites	None
Forms of Teaching and Proportion	Lecture - 2 hours per week per semester Exercise - 2 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Baumol, W.J., Blinder, A.S. (2012) Economics: Principles and Policies, 12th edition, South-Western Cengage Learning, Mason/Ohio. • Mankiw, G.N., Taylor, M.P. (2010) Economics, South-Western Cengage Learning, Mason/Ohio. • Endres, A. (2007): Umweltökonomie, 3. Auflage, Kohlhammer, Stuttgart. • The Law and Economics of Public Health by Frank A. Sloan - This book provides an overview of the legal and economic aspects of public health, including the regulation of healthcare systems and the impact of law on public health outcomes
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	• Written exam, 90 min.
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Lecture / 2 Hours per Week per Semester • Exercise / 2 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 41102 Ecology

assign to: Basics of the International Public Health

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	41102	Mandatory

Modul Title	**Ecology** Ökologie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. Birkhofer, Klaus
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	**Overall** Students will be able to understand ecological principles and functioning of ecosystems and to apply them to different ecosystems. The connection between ecosystem integrity, ecosystem functions and resource management will be understood. **Part "Terrestrial Ecology"** The objective is to outline the fundamentals of ecology, including biodiversity-ecosystem function research in terrestrial ecosystems with a focus on conservation and resource management. Students will gain knowledge about biodiversity as a basic ecological concept, and will be able to understand the different dimensions of biodiversity when focusing on the protection and management of ecosystems. Students will learn about: • Ecophysiology & Population Ecology • The different dimensions of biological diversity and their applied role in conservation and ecosystem management • The role of diversity in ecosystem stability and ecosystem functioning • The ethical and economic justifications of biodiversity protection and related management strategies **Part "Aquatic Ecology"** Students will understand the diversity and variability of freshwater ecosystems. They will obtain knowledge on freshwater ecology, principle functioning of lakes and running waters as well as their role in biogeochemical cycling of landscapes. They will understand the connection between freshwater organisms and ecosystem services. Students will be able to apply general principles of ecology to aquatic ecosystems.

Contents	**Part "Terrestrial Ecology"** • Definitions & measures of biodiversity • The importance of biodiversity for human well-being • Management approaches for biodiversity conservation **Part "Aquatic Ecology"** • Running water ecosystems: variability, characteristics and functions, connectivity, aquatic organisms, food webs, ecosystem engineers • Standing water ecosystems: genesis and typology, physical and chemical properties and biogeochemistry of water and sediment, habitats and organisms
Recommended Prerequisites	Biology, Chemistry, Statistics
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	**Part "Terrestrial Ecology"** • Lecture slides (in Moodle) Recommended readings: Levin - Encyclopedia of Biodiversity (e-book) Jorgensen - Encyclopedia of Ecology (e-book available) Schowalter – Insect Ecology (e-book available) Coleman - Fundamentals of Soil Ecology (e-book available) Van Dyke – Conservation Biology (e-book available) **Part "Aquatic Ecology "** • Lecture slides (in Moodle) Recommended readings: Dodds, Whiles – Freshwater Ecology (e-book available)
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written exam at the end of the lecture period (120 min.) covering both parts of the module. Each part (LE Terrestrial Ecology & LE Aquatic Ecology) contributes 50% to the total number of achievable points.
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• 240537 Lecture Aquatic Ecology • 240731 Lecture Terrestrial Ecology • 240766 Examination Ecology
Components to be offered in the Current Semester	**240539** Examination Ecology

Module 11212 Statistics

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	11212	Compulsory elective

Modul Title	**Statistics** Statistik
Department	Faculty 1 - Mathematics, Computer Science, Physics, Electrical Engineering and Information Technology
Responsible Staff Member	Prof. Dr. rer. nat. habil. Wunderlich, Ralf Prof. Dr. rer. nat. Hartmann, Carsten
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	• Aquirement of basic knowledge and skills in Probability Theory and Mathematical Statistics • Qualifying for solving typical problems from engineering using statistical methods and for critical interpretation of results of statistical investigation The lectures give theoretical fundamentals and explain them at typical examples from engineering. Exercises aim to deepen this knowledge and to apply it at further typical situations. Homework sheets, to be solved independently, serve for further consolidation, deeepening and enhancement of lecture and exercise contents.
Contents	Introduction to fundamentals of probability theory and mathematical statistics: random variables and their distributions (discrete and continuous), limit theorems, laws of large number, point and interval estimations, significance tests (parametric as well as non-parametric for one or two samples), correlation and regression analysis
Recommended Prerequisites	Knowledge of subject matters from the modules • 11110: Mathematics of Engineering I • 11111: Mathematics of Engineering II
Mandatory Prerequisites	none

Forms of Teaching and Proportion	Lecture - 2 hours per week per semester Exercise - 2 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Smith, P. J. : Into Statistics, Springer (Singapore) 1998 • Montgomery, D. C./ Runger, G. C.: Applied Statistics and Probability for Engineers, John Wiley Sons, • Inc. 1994 • Frank, H./ Althoen, S. C.: Statistics, Concepts and Applications, Cambridge University Press 1994 • McClave, J. T.: A First Course in Business Statistics, Prentice Hall 2001 • McClave, J. T./ Sincich, T. L.: A First Course in Statistics, Prentice Hall 2002
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	**Prerequisite:** • Successful completion of homework **Final module examination:** • Written examination, 90 min. or oral examination, 30 min. + preparation time The type (written or oral) will be anounced at the beginning of the lecture period.
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	• Study programme Artificial Intelligence M.Sc.: Compulsory elective module in the complex „Advanced Methods“
Module Components	• Lecture Statistics • Exercise Statistics • Tutorial Statistics • Examination Statistics
Components to be offered in the Current Semester	**130070** Lecture Statistics - 2 Hours per Term **130071** Exercise Statistics - 2 Hours per Term **130072** Tutorial Statistics - 2 Hours per Term **130073** Examination Statistics

Modul 13388 Einführung in die Katalyse

zugeordnet zu: In-depth study

Studiengang Life Science and International Health

Akademischer Grad	Modulnummer	Modulform
Bachelor of Science	13388	Wahlpflicht

Modultitel	**Einführung in die Katalyse** Introduction into Catalysis
Einrichtung	Fakultät 2 - Umwelt und Naturwissenschaften
Verantwortlich	Prof. Dr. rer. nat. habil. Klepel, Olaf
Lehr- und Prüfungssprache	Deutsch
Dauer	1 Semester
Angebotsturnus	jedes Wintersemester
Leistungspunkte	6
Lernziele	Nach der Teilnahme am Modul sind die Studierenden in der Lage, anhand der Verknüpfung von Kenntnissen aus anorganischer, physikalischer und organischer Chemie den Ablauf katalysierter Reaktionen zu untersuchen. Sie sind in der Lage, Aufbau und Wirkunsgweise wichtiger Katalysatorsysteme zu beschreiben sowie wichtige Katalysatortypen zu charakterisieren. Durch das Selbststudium wissenschaftlicher Orginalliteratur können die Studierenden deutsche und englische Texte erschließen sowie deren Inhalte im Kontext des Vorlesungsstoffes reflektieren. Die Studierenden haben darüber hinaus durch die kommunikative Auseinandersetzung in Seminaren studiengangbezogene weitere personale Kompetenzen erworben.
Inhalte	• Elementarschritte katalytischer Zyklen, Kinetik katalysierter Reaktionen, Eigenschaften von Übergangsmetallkomplexen hinsichtlich ihres Einsatzes in der Katalyse, Grundlagen der Biokatalyse, Mechanismus wichtiger technisch relevanter Reaktionen
Empfohlene Voraussetzungen	Absolvierte Module • 13103 Chemie I Allgemeine und Anorganische Chemie, • 13215 Chemie II Organische und Analytische Chemie
Zwingende Voraussetzungen	keine
Lehrformen und Arbeitsumfang	Seminar - 1 SWS Selbststudium - 165 Stunden
Unterrichtsmaterialien und Literaturhinweise	• Videobasiertes Lehrmaterial (asynchron) • Behr, A.: Angewandte homogene Katalyse, Wiley-VCH, 2008.

- Steinborn, D.: Grundlagen der metallorganischen Komplexkatalyse, Viehweg+Teubner Verlag, 2009.
- Beller, M.; Renken A.; van Santen, R. (eds.): Catalysis, Wiley-VCH, 2013.

Modulprüfung	Modulabschlussprüfung (MAP)
Prüfungsleistung/en für Modulprüfung	• Klausur 120 min
Bewertung der Modulprüfung	Prüfungsleistung - benotet
Teilnehmerbeschränkung	keine
Bemerkungen	Basiert auf ausschließlich asynchron angebotenen, videobasierten Vorlesungen; Seminare in Präsenz oder Online (Echtzeit)
Veranstaltungen zum Modul	Seminar - 1 SWS Prüfung
Veranstaltungen im aktuellen Semester	**220584** Seminar Einführung in die Katalyse - 1 SWS **220589** Prüfung Einführung in die Katalyse

Module 14115 Haematology and Oncology

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14115	Compulsory elective

Modul Title	**Haematology and Oncology** Hämatologie und Onkologie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	Students will develop a comprehensive understanding of normal haematopoiesis, immunology, and cancer biology, as well as the pathophysiology of malignant and non-malignant haematological conditions.
Contents	· Basic knowledge of blood components and their function · Origin, development and options for treating cancer · Epidemiology and etiology of major haematological cancers and solid tumors · Psychosocial aspects of cancer care and supportive interventions
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Text Book on Clinical Haematology-Oncology Paperback 22 Feb. 2019, by Timothy Allen (Author)
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written Examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none

Remarks	The course is taught by an external lecturer, PD Dr. Georg Schwabe.
Module Components	Lecture
Components to be offered in the Current Semester	No assignment

Module 14116 Immunology

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14116	Compulsory elective

Modul Title	**Immunology** Immunogie
Department	Faculty GW - Faculty of Health Sciences Brandenburg
Responsible Staff Member	Prof. Dr. rer. nat. habil. Rossol, Manuela
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	After successfully completing the module, students are able to explain the scientific principles of immunology. In the seminar, students have demonstrated that they can analyse, present and discuss current publications from the rapidly growing field of immunology. After successfully completing the module, students will have acquired not only specialist knowledge, but also skills in terms of self-organization, communication skills and dealing with scientific literature.
Contents	The content aspects of the module provide important foundations for a wide range of bioscientific areas. • Cells of the immune system and immune organs and their functions • Cells, mechanisms and molecules of the innate and acquired immune system • Complement system • Antibody classes and their functions • Inflammatory reactions • Interaction of B and T cells and the molecules involved • Antigen presentation with cells and molecules involved • Functions of immunological memory • Process of an immune reaction after infection and vaccination • Presentation and discussion of scientific data
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Exercise - 2 hours per week per semester Study project - 2 hours per week per semester

	Self organised studies - 120 hours
Teaching Materials and Literature	none
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	• Written Examination, 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Exercise • Study project
Components to be offered in the Current Semester	No assignment

Module 14117 Enzymes in Drug Development

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14117	Compulsory elective

Modul Title	**Enzymes in Drug Development** Enzyme in der Arzneimittelentwicklung
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. Dr. rer. nat. Scheibner, Katrin
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	This module explores the critical role of enzymes in drug discovery and development, providing students with a comprehensive understanding of how enzymes function as both targets and tools in pharmaceutical research. The course will cover fundamental concepts of enzymology and their practical applications in drug design, screening, and optimization.
Contents	• Enzyme structure, function, and kinetics • Enzymes as drug targets: identification and validation • High-throughput screening methods for enzyme inhibitors • Structure-based drug design targeting enzymes • Pharmacokinetics and drug metabolism: role of metabolizing enzymes • Enzyme engineering for drug discovery and development • Prodrug strategies and enzyme-activated therapeutics • Drug-drug interactions mediated by enzymes • Emerging technologies in enzyme-based drug discovery
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 2 hours per week per semester Seminar - 2 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Enzymes and Their Inhibitors: Drug Development" edited by H. John Smith and Claire Simons

	• "Opportunities for Accelerating Drug Discovery and Development by Applying Engineered Drug-Metabolizing Enzymes" by Guo-Qiang Chen, published in Drug Metabolism and Disposition
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequsite: • Successful completion of the seminar including a 30 min presentation and 15 min discussion Final Module Examination: • Final written examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Lecture • Seminar
Components to be offered in the Current Semester	No assignment

Module 14123 Bioeconomy

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14123	Compulsory elective

Modul Title	**Bioeconomy** Bioökonomie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Dr. rer. nat. Braune, Steffen
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	The bioeconomy is an interdisciplinary field that combines ecological, social and economic dimensions in order to develop sustainable solutions for the challenges of the 21st century. This module offers students the opportunity to gain an overview of the numerous topics of the bioeconomy and to promote an awareness of sustainability.
Contents	Basic knowledge of the bioeconomy: - Knowledge of bio-based value chains - Innovations in the bio-based economy - Biorefineries and biotechnological products - Processing of biofuels - Utilization of waste streams - Environmentally friendly products made from renewable raw materials - National bioeconomy strategy.
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Bioeconomy for Beginners - Joachim Pietzsch et al. (2020) • Bioeconomy: Shaping the Transition to a Sustainable, Biobased • Economy - Iris Lewandowski (2020)
Module Examination	Final Module Examination (MAP)

Assessment Mode for Module Examination	written examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	No offer in 2025!
Module Components	lecture
Components to be offered in the Current Semester	No assignment

Module 14124 Personalized Medicine

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14124	Compulsory elective

Modul Title	**Personalized Medicine** Personifizierte Medizin
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Dr. sc. med. Kammerer, Sarah
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	This module provides a comprehensive introduction to personalized medicine, exploring its principles, applications, and potential to revolutionize healthcare. Students will gain insights into how individual genetic, environmental, and lifestyle factors can be used to tailor medical decisions, practices, and treatments for optimal patient outcomes.
Contents	Key topics covered include: • Fundamentals of personalized medicine and precision healthcare • Genomics, pharmacogenomics, and other 'omics' technologies • Biomarker identification and application in clinical practice • Data science and bioinformatics in personalized medicine • Ethical, legal, and social implications of personalized healthcare • Real-world applications in disease prevention, diagnosis, and treatment • Challenges and future directions in implementing personalized medicine
Recommended Prerequisites	none
Mandatory Prerequisites	none
Forms of Teaching and Proportion	Lecture - 4 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Genomic and Personalized Medicine" by Geoffrey S. Ginsburg and Huntington F. Willard.

	• "Personalised Medicine, Individual Choice and the Common Good" by Britta van Beers (Vrije Universiteit, Amsterdam), Sigrid Sterckx (Universiteit Gent, Belgium), and Donna Dickenson (Birkbeck College, University of London)
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	Written Examination (120 min)
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• lecture
Components to be offered in the Current Semester	No assignment

Module 41201 International Environmental Law

assign to: In-depth study

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	41201	Compulsory elective

Modul Title	**International Environmental Law** Internationales Umweltrecht
Department	Faculty 5 - Business, Law and Social Sciences
Responsible Staff Member	Prof. Dr. jur. Albrecht, Eike
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	After completing the module, students are able to : • Understand the key concepts of law and international environmental law including its evolution as well as sources. • Name an understand legal principles used in establishing and maintaining environmental quality • Identify and analyse problems relating to implementation and enforcement of multilateral environmental agreements. • Comprehend techniques of solving environmental problems through environmental law
Contents	**Lecture:** "International Environmental Law" • Introduction to international law • Basic features of international law especially Vienna Treaty Conventions • UN environmental declarations • International environmental treaties with special emphasis on biodiversity and climate change Students can chose between 2 different seminars: 1. **Seminar 1:** "Implementation of the international environmental laws on Air Pollution Water, wastewater management and solid waste“ 2. **Seminar 2:** "Transposition of International Climate Policy in the EU and Germany"
Recommended Prerequisites	None
Mandatory Prerequisites	none

Forms of Teaching and Proportion	Lecture - 2 hours per week per semester Seminar - 2 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• Birnie/Boyle/Redgwell, International Law and the Environment, 4th edition, Oxford University Press, 2021 • Knopp/Epstein/Hoffmann, International and European Environmental Law with Reference to German Environmental Law – A Guide for International Study Programs, 2nd edition, Berlin 2019 • Albrecht/Egute/Wanki/Ezeamama (eds.), International environmental law (IEL) – Agreements and introduction. 6th expanded and updated edition, 2022 Additional literature will be announced in the first class meeting.
Module Examination	Final Module Examination (MAP)
Assessment Mode for Module Examination	• Written examination, 120 minutes In total 60 points can be achieved. The written examination includes the contents of the lecture and the seminar.
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	A yearly excursion in relation to the module may be organised. Depending on the situation, teaching formats and the written examination might be offered digitally or in presence. Students are required to inform themselves on the website of the chair and the Moodle course of the module.
Module Components	• Lecture International Environmental Law • Seminars that will be announced in class.
Components to be offered in the Current Semester	**520229** Lecture International Environmental Law (Modul 41201) - 2 Hours per Term **520230** Seminar Implementation of the international laws on air pollution water, wastewater management and solid waste - 2 Hours per Term **520234** Seminar EU Climate Adaptation and Mitigation Policies and Frameworks - 2 Hours per Term **520233** Examination International Environmental Law (Modul 41201)

Module 14118 Introduction to Laboratory Work

assign to: Internship

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14118	Mandatory

Modul Title	**Introduction to Laboratory Work** Einführung in die Laborarbeit
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	This introductory laboratory course is designed for first-year students of the program. The module aims to provide a comprehensive understanding and practical experience with various laboratory techniques, instruments, and safety protocols essential in modern biomedical research. Upon completion of this module, students will be able to: • Understand basic laboratory principles and ethics. • Operate safely within a controlled environment using personal protective equipment (PPE). • Perform routine laboratory procedures such as pipetting, measuring pH, and handling biological samples. • Use various analytical instruments for the identification and quantification of substances. • Record data accurately in compliance with Good Laboratory Practice (GLP) standards. The students acquire personal skills related to the course through communicative discussion in the courses. They are able to work on and discuss chemical issues in small groups.
Contents	• Planning experiments • Overview of laboratory safety protocols • Basics of stoichiometric calculations • Familiarization with personal protective equipment (PPE) • Basic laboratory etiquette and ethics • Pipetting techniques and precision measurement • Handling biological samples safely • Sterilization methods for lab instruments and materials

	• Introduction to pH meters, spectrophotometers, and other basic analytical tools • Calibration of equipment and standard operating procedures (SOPs) • Basic data analysis using laboratory software • Microscopy techniques for biological samples • Centrifugation methods for separating particles or liquids • Handling chemicals safely in the lab environment • Advanced use of spectrophotometers and other analytical tools • Chromatography principles (e.g., HPLC, TLC) • Data interpretation using laboratory software • Writing clear and concise scientific reports • Understanding the importance of Good Laboratory Practice (GLP) standards • Case studies on ethical dilemmas in biomedical research
Recommended Prerequisites	none
Mandatory Prerequisites	Successful completion of Biomedical Data Science 14102, General Biology 14103, Biomedical Information Science 14104
Forms of Teaching and Proportion	Seminar - 1 hours per week per semester Laboratory training - 3 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• required material will be provided • "Basic Laboratory Methods for Biotechnology" by Lisa A. Seidman and Cynthia J. Moore • Laboratory Safety: A Self-Assessment Workbook" by James A. Kaufman
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequisite: • successful completion of the occupational safety instruction, submission of the report on the experiments carried out during the laboratory training (30-40 pages), ungraded Final Modul Examination: • Written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start of the study programme from winter semester 2025/26!
Module Components	• Laboratory training / 3 Hours per Week per Semester • Seminar/ 1 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14120 Biomedical Lab Course I - Microbiology

assign to: Internship

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14120	Mandatory

Modul Title	**Biomedical Lab Course I - Microbiology** Biomedizinischer Laborkurs I - Mikrobiologie
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	After completing the module, students will know the essential basics of microbiological laboratory practice. Participation in the internship teaches basic techniques of microbiology such as isolation, cultivation and identification of bacteria and fungi. Communication skills are improved by documenting an experiment carried out over several weeks in the form of a scientific publication manuscript. Students answer research questions in the field of cell and molecular biology independently by planning, carrying out and evaluating experiments using specific working techniques. They access information independently via the Internet. Students have learned to organize themselves and to work alone or effectively in groups with a division of labor. They develop an understanding of their roles in the team and take responsibility for themselves and the group. After completing the module, students are able to think through instructions for experiments and implement them experimentally. They understand the necessary calculations and evaluation methods and can evaluate results statistically. They will be able to analyse errors that occur during experiments and recognise and explain deviations from expected results
Contents	• Microbiological work • Microscopic techniques • Morphology of fungi and bacteria • Quantification of microorganisms in habitats • Creation of growth curves • Bacterial viruses • Growth inhibition • Metabolic tests for identifying microorganisms

	• Natural gene transfer • Isolation of microorganisms from a soil sample (complex test)
Recommended Prerequisites	none
Mandatory Prerequisites	Successful completion of "Introduction to Laboratory Work" (14118) and "Microbiology" (14105)
Forms of Teaching and Proportion	Seminar - 1 hours per week per semester Laboratory training - 3 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Molecular Microbiology Laboratory: A Writing-Intensive Course" by Bruce Geller and Katherine Field. This e-book focuses on molecular microbiology techniques and emphasizes scientific writing skills, which can be valuable for students learning to document their lab work. • further required material will be provided (like a script for the experiments)
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequisite: • successful completion of the occupational safety instruction, submission of the report on the experiments carried out during the laboratory training (30-40 pages), ungraded Final Modul Examination: • Written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Seminar / 1 Hours per Week per Semester • Laboratory training / 3 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14121 Biomedical Lab Course II - Functional Bioanalytics

assign to: Internship

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14121	Mandatory

Modul Title	**Biomedical Lab Course II - Functional Bioanalytics** Biomedizinischer Laborkurs II - Funktionelle Bioanalytik
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every summer semester
Credits	6
Learning Outcome	Graduates are able to • understand basic techniques, primarily used in medical diagnostics. • apply diagnostic procedures under supervision. • choose a suitable technique for a clinical/diagnostic question. • interpret diagnostic test results. • assess and critically evaluate the significance of diagnostic tests. • understand new methods from the current literature The aim of medical treatment is always to alleviate or cure an illness. In order to be able to use the right therapies, a comprehensive diagnosis must be made. A medical diagnosis is based on the examination of various parameters that are validated using suitable measurement methods. There are different measurement methods for each parameter to be measured. A laboratory employee must find the most medically and economically optimal measurement method from a large number of available measurement methods. In addition to long-established measurement methods, innovative methods are entering the laboratory diagnostics market at an ever faster pace. Students gain insights into modern laboratory measurement methods. Students recognize new trends in medical bio-analytics. Students can follow in detail the development and implementation of new bio-analytical ideas, so they acquire system- and future-thinking competencies and are able to adapt methods to their scientific question.
Contents	The event is held by employees of the multi-parameter diagnostics department in collaboration with scientific cooperation partners. Lecturers present their current research topics. Students thus gain an insight into research aspects from science and business. Students recognize the value of translational research, through which basic

	research and knowledge from the university is transferred to business and implemented there. Content is adapted to the current research areas. Topic areas include: · Autoimmune diseases · Biochips · CRISPR/Cas9 · Epitope mapping and aptamers · Fluorescence-labeled immunoassays · Forensics · Microbiology · PCR methods · Sequencing methods
Recommended Prerequisites	none
Mandatory Prerequisites	Successful completion of Biomedical Lab Course I – Microbiology (14120) and Biochemistry (14109)
Forms of Teaching and Proportion	Seminar - 1 hours per week per semester Laboratory training - 3 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• required material will be provided
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequisite: • successful completion of the occupational safety instruction, submission of the report on the experiments carried out during the laboratory training (30-40 pages), ungraded Final Module Examination: • Written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	Start of the study programme from winter semester 2025/26!
Module Components	• Seminar / 1 Hours per Week per Semester • Laboratory training / 3 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Module 14122 Biomedical Lab Course III - Cell culture

assign to: Internship

Study programme Life Science and International Health

Degree	Module Number	Module Form
Bachelor of Science	14122	Mandatory

Modul Title	**Biomedical Lab Course III - Cell culture** Biomedizinischer Laborkurs III - Zellkultur
Department	Faculty 2 - Environment and Natural Sciences
Responsible Staff Member	Prof. PD Dr. rer. nat. habil. Rödiger, Stefan
Language of Teaching / Examination	English
Duration	1 semester
Frequency of Offer	Every winter semester
Credits	6
Learning Outcome	• After completing the module, the students will be able to present the current literature on a research area in a summarized form. By presenting and discussing their results from the laboratory course they are able to critically question research results. In the practical course, students have to work on sophisticated projects which need competences such as teamwork, organized project planning (project management) and analytical abilities • Acquire theoretical knowledge and practical experience in basic principles of cell culture techniques. • Get familiar with the morpholgy, physiology and way to work with different animal and human cell lines. • Generate awareness for the use of cells in culture (advantages and limitations). • Understand the principles as well as application of cell biological methods to characterise the main parameters of cell behaviour like proliferation, differentiation, and viability. • Discriminate the special features of cells growing as a monolayer in a culture flask (2D-culture). • Applying advanced techniques of cell biological methods to characterise the main parameters of cell behaviour like proliferation, viability, toxicity, and differentiation. • Knowledge and experience in microscopical techniques (Phase contrast, brightfield, fluorescence)
Contents	• Sterile working technique, media preparation • Routine maintenance of cell lines: Medium replacement, subculture of adherend and suspension cells, cell counting, cryopreservation,

	contamination control (microscopical observation, mycoplasma screening) • Cultivation of cells in monolayer (2D) • Application of special test systems to monitor proliferation, viability, and toxicity in monolayer cells • Analyses of morphology of cells in 2D • Working with different microscopic techniques: Phase contrast microscopy (basis “life cell” analyses), brightfield microscopy, fluorescence microscopy
Recommended Prerequisites	none
Mandatory Prerequisites	"Biomedical Lab Course II - Functional Bioanalytics", 14121
Forms of Teaching and Proportion	Seminar - 1 hours per week per semester Laboratory training - 3 hours per week per semester Self organised studies - 120 hours
Teaching Materials and Literature	• "Cell Culture for Biologists: A Practical Approach" by D. Rickwood and B.D. Hames - This text offers practical guidance on cell culture techniques, with a focus on sterile working practices. • further required material will be provided (script for the experiments)
Module Examination	Prerequisite + Final Module Examination (MAP)
Assessment Mode for Module Examination	Prerequisite: • successful completion of the occupational safety instruction, submission of the report on the experiments carried out during the laboratory training (35-45 pages), ungraded Final Module Examination: • Written exam 120 min
Evaluation of Module Examination	Performance Verification – graded
Limited Number of Participants	none
Remarks	none
Module Components	• Seminar / 1 Hours per Week per Semester • Laboratory training / 3 Hours per Week per Semester
Components to be offered in the Current Semester	No assignment

Erläuterungen

Das Modulhandbuch bildet als Teil der Prüfungsordnung die Rechtsgrundlage für ein ordnungsgemäßes Studium. Darüber hinaus soll es jedoch auch Orientierung bei der Gestaltung des Studiums geben.

Dieses Modulhandbuch wurde am 24. September 2025 automatisch für den Bachelor (universitär)-Studiengang Life Science and International Health (universitäres Profil), PO-Version 2025, aus dem Prüfungsverwaltungssystem auf Basis der Prüfungsordnung generiert. Es enthält alle zugeordneten Module einschließlich der ausführlichen Modulbeschreibungen mit Stand vom 24. September 2025. Neben der Zusammensetzung aller Veranstaltungen zu einem Modul wird zusätzlich das Veranstaltungsangebot für das jeweils aktuelle Semester gemäß dem Veranstaltungsverzeichnis der BTU ausgegeben.

The module catalogue is part of the examination regulation and as such establishes the legal basis for studies according to the rules. Furthermore, it should also give orientation for the organisation of the studies.

This module catalogue was generated automatically by the examination administration system on the base of the examination regulation on the 24 September 2025, for the Bachelor (universitär) of Life Science and International Health (research-oriented profile). The examination version is the 2025, Catalogue contains all allocated modules including the detailed module descriptions from 24 September 2025. Apart from the composition of all components of a module, the list of lectures, seminars and events for the current semester according to the catalogue of lectures of the BTU is displayed.